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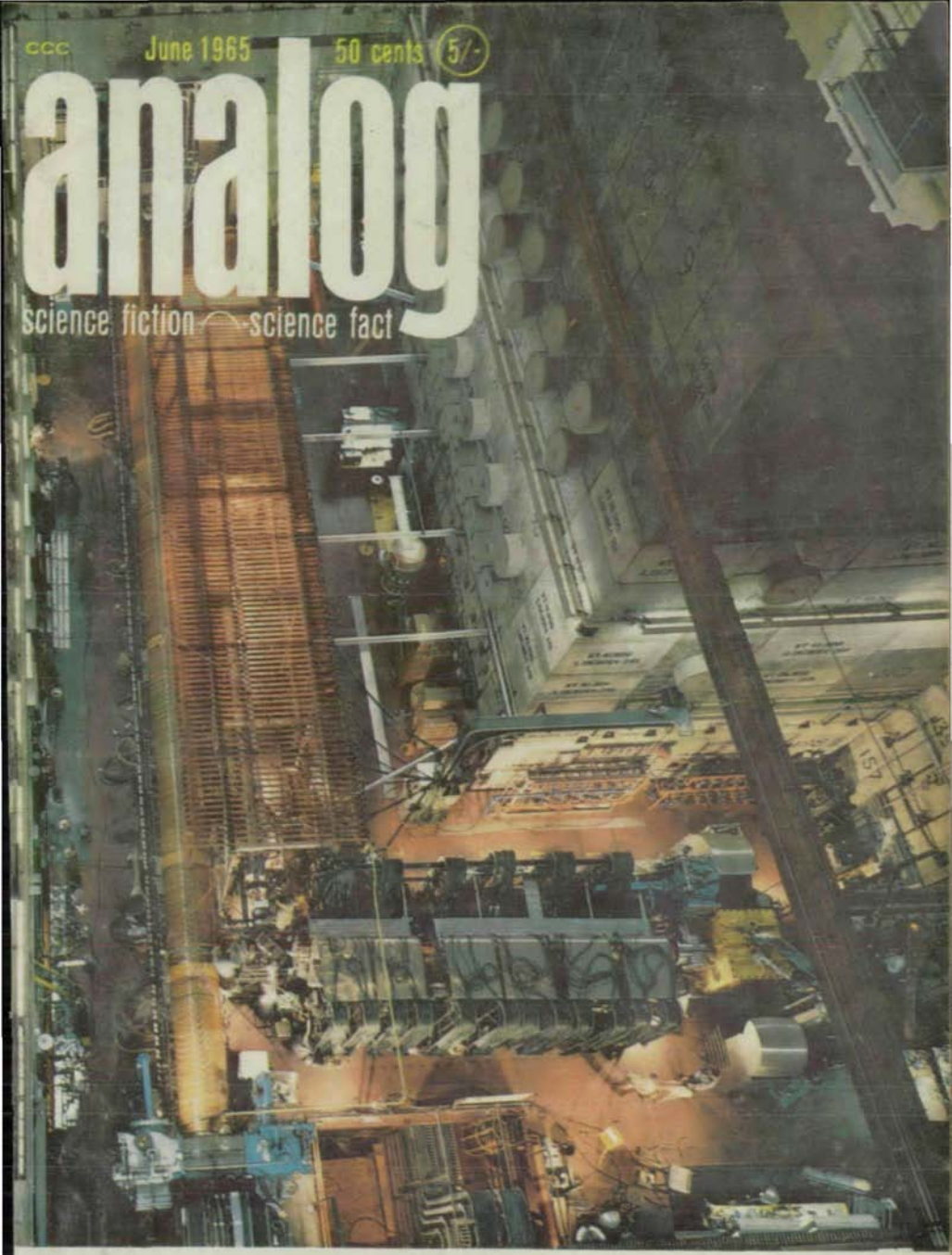

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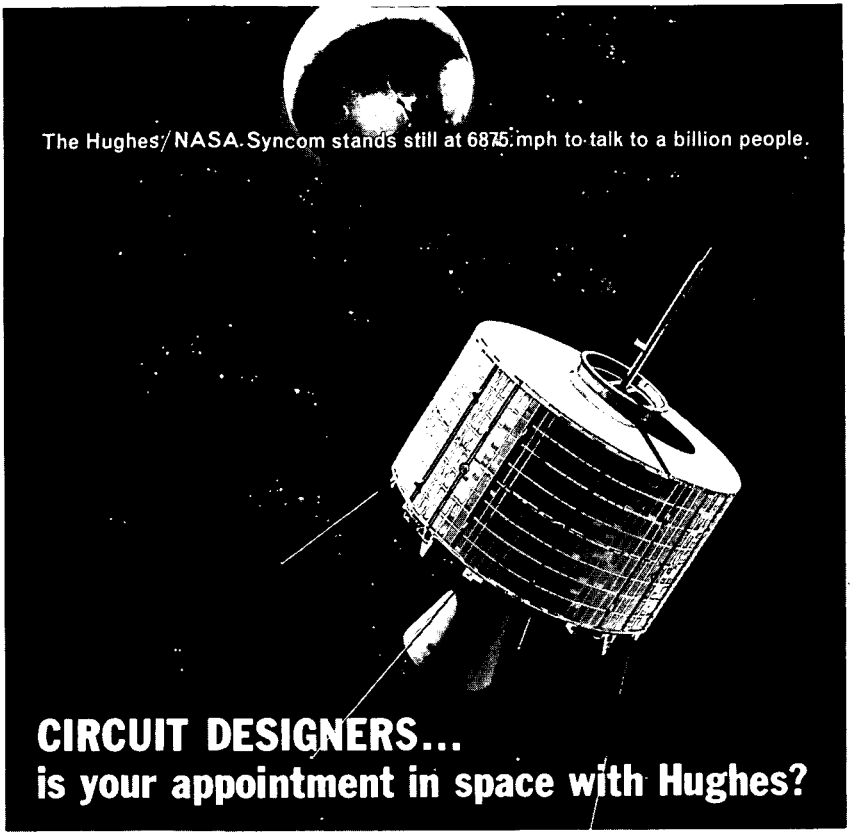

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"THE LAWS OF THINGS"

an editorial by

JOHN W. CAMPBELL

There is one area where Science and Religion become rather completely confused. Now basically, a Religion has to do with the nonmaterial side of Man's being; it is rooted in Faith—belief rather than objective evidence—and deals almost entirely with Man's emotional and moral structure. Its truths are revealed by Prophets after introspection and revelations from God (or Gods).

There's one area where Science becomes almost inextricably entangled in Religion—that area of Science that seeks to deal with Man's nonmaterial self, with his emotions and morality rather than his physical self. Psychology is the study of the Psyche, or Spirit, or Soul.

I don't like to attack any man's religion—but when a should-be science acts on Faith in the Revelations of a Prophet without reevaluation . . .

I suggest that the Great Prophet Freud needs some reevaluation at a considerably deeper level than the minuscule modifications that are currently acceptable among psychotherapists.

Consider this: Dr. Freud did his early investigations, on which his great theories of the universal underlying drives in all Mankind are based, among (1) largely Jewish people in (2) Vienna, (3) during the most extremely prudish period of Western culture. That is, among a cultural enclave in the midst of a mid-European city, during the midst of a very unusually prudish cultural period.

From this he derived as the Great Basic of all Mankind's motivations, Sex, and as the central conflict of all people, the Oedipus complex.

Now it happens that in the tradi-

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tional Jewish culture, the mother is a powerfully dominant figure in the home—in effect, the Jewish culture is matriarchic. And the period in which Freud's patients were oriented was known as the Victorian Period, because of the tremendous influence that Britain's great Queen exerted over the entire world of her time.

I cannot help wondering what great universal motivations Freud would have found if he had studied patients among an equally restricted group of the Polynesians of Tahiti, say. There, there are almost no sexual inhibitions.

Freud didn't discover that a motivation other than Sex existed until about 1918—when he discovered the Death Wish. (He'd begun getting patients who'd been through that form of hell known as War—men to whom Sex was a less immediate problem than staying alive.)

The old question "Which leg of a three-legged stool is the most important?" has a practical answer. "The one that's missing."

From the cultural peculiarities of the "Gay '90s," Freud discovered the "missing leg" of Sex, and decided that that was the One Fundamental Motivation of All Mankind Everywhere.

Wonder what he'd have discovered as the Universal Motivation of Mankind if he'd done his studies entirely among the Dobu Islanders? Their culture holds that paranoid efforts to murder your neighbors by black magic—"Every man a wizard!"—is the normal way of life. They are poor, unfortunate individuals who have become insane and actually trust other people! These would, of course, have been Freud's abnormal neurotic patients there.

It seems, at first glance, that Freud's insistence on Sex in the ultra-prudish period of the 1890s-1900s showed great intellectual courage, to so fly in the face of his culture.

That's somewhat open to question. Did he, actually, *attack* the beliefs of his period? Or did he, rather, support them? That is, remember that the prudes of the time held that Sex was the Source of All Evil and Awful things. And what Freud appeared to them to be saying was that Sex was the cause of insanity and neurosis—wherefore the most violent prudes could happily chortle "See! See! We *told* you Sex was Evil! Now you know we were right! The great Dr. Freud has *proven* that it's nasty Sex that causes insanity, just as we said all along!"

Be that as it may, doing his research on a cultural enclave, in a Central European city, during an exceptionally prudish period, he (surprise! surprise!) found that Sex was the Universal Underlying Motivation. Not until the terrors of World War I drastically altered the cultural orientation around him did he discover *any* other motivation!

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As of 1890-1900, modern cultural anthropology was barely beginning to get rolling. The use of statistical methods in analysis in the living sciences had not yet been accepted. (Gregor Mendel had been completely rejected for trying to use mathematical methods—statistics—in biology only a short while before, and his analytical method hadn't yet been fully accepted.)

Of course computer technology, logic circuit equations, and concepts of negative feedback loops were still a half-century in the future.

The immense dominance of European culture over all others in the world of 1890 made a central European "know" that "lesser breeds without the law" had weird customs, but that those weren't really *human*—weren't really relevant to the Universal Laws of Human Psyches.

Another aspect of Freud's theories that were very acceptable in that period was that the motivational systems Freud discovered were unique to human beings; that animals didn't have those characteristics. (And that, of course, is appropriate to the Science of the Psyche, because everyone knows that only Men have Souls.)

Then there are immense areas of both experimental-physiological and intellectual-analysis that have been opened up since Freud did his work—which have not been integrated with Freudian concepts, nor used to check the validity of the Freudian ideas.

Information Theory didn't exist in the 1890s. No one had, then, studied the micro-structure of the nerve-message pathways in the nervous system. The nature and limitations of Logic and logical analysis weren't understood. (Goedel's Proof that showed that Logic could *not* solve all problems hadn't been developed.)

And, finally, as of 1900, of course, Freud's theories hadn't been tried out in practice on actual neurotic patients all over the world for half a century.

There are, in Freudian Beliefs, things like "Oral Eroticism." Since *all* motivation must be either Sex or Death Wish, and Sex, of course, dominates, any observed behavioral phenomena must be "eroticism" of some sort. Freud observed that people like to put things in their mouths, to suck thumbs, soda straws, cigars, cigarettes, candies, et cetera, and to show acute interest in their mouths. Since Sex and only Sex underlies motivation, this is, obviously and inescapably—unless you escape Freud—Oral Eroticism.

Of course, Freud wasn't aware of the violent psychic disturbances that result from sensory deprivation. The experiments hadn't been made at that time. Put a man in an environment where he can neither

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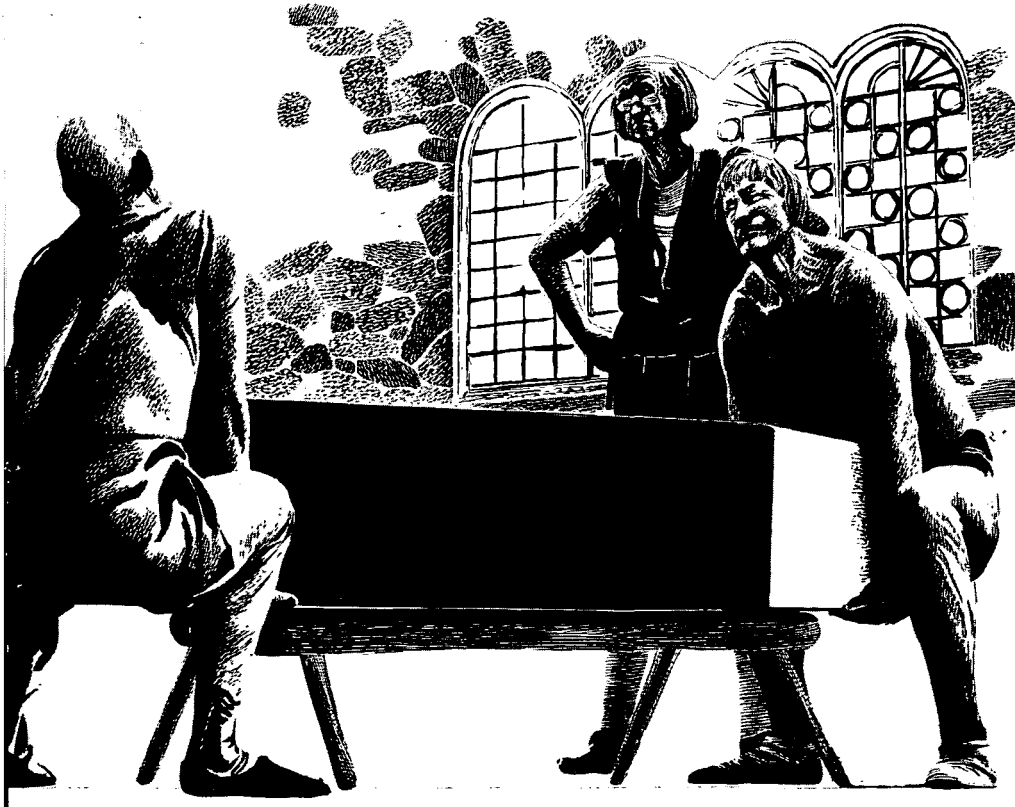
The Muddle of the Woad

Whether you use magic
or Science in your detective work—
what you know how to use,
the criminals will learn to use against you!

Randall Garrett

Illustrated by John Schoenherr



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Both pain and pride were sending their counterbalancing energies through the nervous system of Walter Gotobed, Master Joiner for His Grace, the Duke of Kent, as he opened the door of his workshop. The pain, like the pride, was mental in origin; in spite of his seventy-odd years, Master Walter was still blessed with strength in his wiry body and steadiness in his careful hands. With his spectacles perched properly on his large, thin, bony nose, he could still draw an accurate plan for anything from a closet to a cigar box. Come next Trinity Sunday, the twenty-fourth of May, the Year of Our Lord 1964, Master Walter would be celebrating his fortieth anniversary of his appointment as Master Joiner to the Duke. He was now on his second Duke, the Old Duke having died in 1927, and would serve a third before long. The Dukes of Kent were long-lived, but a man who works with fine woods, absorbing the strength and the agelessness of the great trees from which they come, lives longer still.

The workshop was full of woody smells—the spiciness of cedar, the richness of oak, the warm tang of plain pine, the fruity sweetness of apple—and the early morning sunlight coming in through the windows cast gleaming highlights on the cabinets and desks and chairs and tables that filled the shop in various stages of progress. This was Master Walter's world, the atmosphere in which he worked and lived.

Behind Master Walter came three more men: Journeyman Henry Lavender and the two apprentices, Tom Wilderspin and Harry Venable. They followed the Master in, and the four of them walked purposefully towards a magnificent creation in polished walnut that reposed on a bench in one corner. Two paces from it, Master Walter stopped.

"How does it look, Henry?" Master Walter asked without turning his head.

Journeyman Henry, not yet thirty, but already having about him the tone of a woodcraftsman, nodded with satisfaction and said: "Very beautiful, Master Walter, very beautiful." It was honest appreciation, not flattery, that spoke.

"I think Her Grace the Duchess will be pleased, eh?" the old man said.

"More than pleased, Master. Mmm-m. There's a bit of dust on it, even since last night. You, Tom! Get a clean rag with a little lemon oil on it and give it another polish." As Tom the 'prentice scampered off in obedience, Henry Lavender continued: "His Grace the Duke will appreciate your work, Master; it's one of the finest things you've turned out for him."

"Aye. And that's something you must remember, Henry—and something you two lads must get through your heads. It's not fancy

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carving that makes the beauty of wood; it's the wood itself. Carving's all right in its place, mind you; I've nothing against carving if it's properly done. But the beauty's in the wood. Something plain like this, without fanciness, without ornament, shows that wood, *as wood,* is a creation of God that can't be improved upon. All you can ever hope to do is bring out the beauty that God Himself put there. Here, give me that rag, young Tom; I'll put the final polish on this myself." As he moved the oily rag, with its faint lemon scent, over the broad, flat surface, Master Walter went on: "Careful craftsmanship is what does it, lads. Careful craftsmanship. Each piece joined solidly to the next, glued tightly, screws in firmly, with no gaps or spaces—that's what makes *good* work. Matching the grain, carefully choosing your pieces, planing and sanding to a perfect surface, applying your finish, wax or varnish or shellac, to a fine smoothness—that's what makes it *fine* work. And design—ah, *design——that* makes it *art!*

"All right, now, you, Tom, take the front end. Harry, you take the other. We've a stairway to climb, but you're both strong lads and it's not too heavy. Besides, a joiner and cabinet maker must have strong muscles to do his work and the exercise will be good for the both of you."

Obediently, the 'prentices grasped the ends they had been assigned and lifted. They had carried it before and knew to a pound how much it weighed. They heaved upwards.

And the beautifully polished walnut scarcely moved.

"Here! What's the matter?" said Master Walter. "You almost dropped it!"

"It's *heavy,* Master," said Tom. "There's somethin' in it.

"Something in it? How could there be?" Master Walter reached out, lifted the lid. And almost dropped it again. "Good God!"

Then there was a stunned silence as the four men looked at the thing that lay within.

"A dead man," said Journeyman Henry after a moment.

That was obvious. The corpse was certainly a corpse. The eyelids were sunken and the skin waxy. The man was thoroughly, completely dead.

To make the horror even worse, the nude body—from crown of head to tip of toe—was a deep, almost indigo, blue.

Master Walter found his breath again. His feelings of surprise and horror had vanished beneath a wave of indignation. "But he don't belong here! He'd got no right! No right at all!"

"Daresay it ain't his fault, Master Walter," Journeyman Henry ventured. "He didn't get there by himself."

"No," said Master Walter, gain-

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ing control of himself. "No, of course not. But what a *peculiar* place to find a corpse!"

In spite of his own feelings, it was all Apprentice Tom could do to suppress a snigger.

What better place to find a corpse than in a coffin?

Even the most dedicated of men enjoys a holiday now and then, and Lord Darcy, Chief Criminal Investigator for His Royal Highness, Prince Richard, Duke of Normandy, was no exception. He not only enjoyed his work, but preferred it above all others. His keen mind found satisfaction in solving the kind of problems that, by the very nature of the work, were continually being brought to his attention. But he also knew that a one-track brain became stale very shortly—and besides he enjoyed letting his mind drift for a while.

Then, too, there was the pleasure of coming home to England. France was fine. It was an important part of the Empire, and working for His Highness was pleasurable. But England was his home, and getting back to England once a year was . . . well, a relief. In spite of the fact that England and France had been one country for eight hundred years, the differences were still enough to make an Englishman feel faintly foreign in France. And, he supposed, vice versa.

Lord Darcy stood at one side of the ballroom and surveyed the crowd. The orchestra was pausing between numbers, and the floor was full of people talking, waiting for the next dance. He took a drink from the whisky-and-water that he had been nursing along. This sort of thing, he congratulated himself, palled within two weeks, while his real work took fifty weeks to become irritating. Still, each was a relief from the other.

Baron Dartmoor was a decent sort, an excellent chess player, and a good man with a story now and then. Lady Dartmoor had a knack of picking the right people to come to a dinner or a ball. But one couldn't stay forever at Dartmoor House, and London society wasn't everything it was assumed to be by those who didn't live there.

Lord Darcy found himself thinking that it would be good to get back to Rouen on the twenty-second of May.

"Lord Darcy, do pardon me, but something has come up."

Darcy turned at the sound of the woman's voice and smiled. "Oh?

"Will you come with me?"

"Certainly, my lady."

He followed her, but there was a nervousness in her manner, a tautness in her behavior, that told him there was something out of the ordinary here.

At the door to the library, she paused. "My lord, there is a . . . a gentleman who wishes to speak to you. In the library."

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"A gentleman? Who is he, my lady?"

"I—" Lady Dartmoor drew herself up and took a breath. "I am not at liberty to say, my lord. He will introduce himself."

"I see." Lord Darcy unobtrusively put his hands behind his back and with his right hand drew a small pistol from the holster concealed by the tails of his green dress coat. This didn't exactly have the smell of a trap, but there was no reason to be careless.

Lady Dartmoor opened the door. "Lord Darcy, S . . . sir."

"Show him in, my lady," said a voice from within.

Lord Darcy went in, his pistol still concealed behind his back and beneath his coattails. Behind him, he heard the door close.

The man was standing with his back to the door, looking out the window at the lighted streets of London. "Lord Darcy," he said without turning, "if you are the man I have been brought to believe you are, you are dangerously close to committing the capital crime of High Treason."

But Lord Darcy, after one look at that back, had reholstered his pistol and dropped to one knee. "As Your Majesty knows, I would rather die than commit treason against Your Majesty."

The man turned, and for the first time in his life Lord Darcy found himself face to face with His Imperial Majesty, John IV, King and Emperor of England, France, Scotlant, Ireland, New England, New France, Defender of the Faith, et cetera.

He looked a great deal like his younger brother, Richard of Normandy—tall, blond, and handsome, like all the Plantagenets. But he was ten years older than Duke Richard, and the difference showed. The King was thirty, only a few years younger than Lord Darcy, but the lines in his face made him look older.

"Rise, my lord," said His Majesty. He smiled. "You *did* have a gun in your hand, didn't you?"

"I did, Your Majesty," Lord Darcy said, rising smoothly. "My apologies, Sire."

"Not at all. Only what I should have expected of a man of your capabilities. Please be seated. We will not be interrupted; my lady of Dartmoor will see to that. Thank you. We have a problem, Lord Darcy."

Darcy seated himself and the King took a chair facing him. "For the time being, my lord," said the King, "we shall forget rank. Don't interrupt me until I have given you all the data I have. Then you may ask questions as you will."

"Yes, Sire."

"Very well. I have a job for you, my lord. I know you are on holiday, and it pains me to interrupt your leisure—but this needs looking into. You are aware of the activities of

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the so-called Holy Society of Ancient Albion."

It was a statement, not a question. Lord Darcy and every other Officer of the King's Justice knew of the Society of Albion. They were more than just a secret society; they were a pagan sect which repudiated the Christian Church. They were reputed to dabble in Black Magic, they practiced a form of nature-worship, and they claimed direct organizational descent from the pre-Roman Druids. The Society, after a period of toleration during the last century, had been outlawed. Some said that it had remained in hiding during all the centuries since the triumph of Christianity and had only revealed itself during the easy-going Nineteenth Century, others said that its claim of antiquity was false, that it had been organized during the 1820s by the eccentric, perhaps slightly mad, Sir Edward Finnely. Probably both versions were partly true.

They had been outlawed because of their outspoken advocation of human sacrifice. Rejecting the Church's teaching that the Sacrifice of the Cross obviated for all time any further sacrifice of human life, the Society insisted that in times of trouble the King himself should die for the sake of his people. The evidence that William II, son of the Conqueror, had been killed "by an arrow offshot" by one of his own men for just that purpose added weight to the story of the antiquity of the Society. William Rufus, it was believed, had been a pagan himself, and had gone willingly to his death—but it was not likely that any modern Anglo-French monarch would do so.

Originally, it had been one of the tenets of their belief that the sacrificial victim must die willingly, even gladly; mere assassination would be pointless and utterly lacking in efficacy. But the increasing tension between the Empire and the Kingdom of Poland had wrought a change. This was a time of troubles, said the Society, and the King must die, will he or no. Evidence showed that such sentiments had been carefully instilled in the membership of the Society by agents of King Casimir IX himself.

"I doubt," said King John, "that the Society poses any real threat to the Imperial Government. There simply aren't that many fanatics in England. But a King is as vulnerable to a lone assassin—especially a fanatic—as any one else. I do not consider myself indispensable to the Empire; if my death would benefit the people, I would go to the block today. As it is, however, I rather feel that I should like to go on living for a time.

"My own agents, I must tell you, have infiltrated the Society successfully. Thus far, they have reported that there is no hint of any really organized attempt to do away with me. But now something new has come up.

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"This morning, shortly before seven o'clock, His Grace the Duke of Kent passed away. It was not unexpected. He was only sixty-two, but his health had been failing for some time and he has been failing rapidly for the past three weeks. The best Healers were called in, but the Reverend Fathers said that when a man has resigned himself to dying there is nothing the Church can do.

"At exactly seven o'clock, the Duke's Master Joiner went into his shop to get the coffin that had been prepared for His Grace. He found it already occupied—by the body of Lord Camberton, Chief Investigator for the Duchy of Kent.

"He had been stabbed—*and his body was dyed blue!*"

Lord Darcy's eyes narrowed.

"It is not known," the King continued, "how long Lord Camberton has been dead. It is possible that a preservative spell was cast over the body. He was last seen in Kent three weeks ago, when he left for a holiday in Scotland. We don't know yet if he ever arrived, though I should get a report by teleson very shortly. Those are the facts as I know them. Are there any questions, Lord Darcy?"

"None, Sire." There was no point in asking the King questions which could be better answered in Canterbury.

"My brother Richard," said the King, "has a high regard for your abilities and has communicated to me in detail regarding you. I have full respect for his judgment, which was fully borne out by your handling of the 'Atlantic Curse' case last January. My personal agents, working for months, had got nowhere; you penetrated to the heart of the matter in two days. Therefore, I am appointing you as Special Investigator for the High Court of Chivalry." He handed Lord Darcy a document which he had produced from an inside coat pocket. "I came here incognito," he went on, "because I do not want it known that I am taking a personal interest in this case. As far as the public is to know, this was a decision by the Lord Chancellor—quite routine. I want you to go to Canterbury and find out who killed Lord Camberton and *why*. I have no data. I want you to get me the data I need."

"I am honored, Sire," said Lord Darcy, pocketing the commission. "Your wish is my command."

"Excellent. A train leaves for Canterbury in an hour and"—His Majesty glanced at his wrist watch —"seven minutes. Can you make it?"

"Certainly, Sire."

"Fine. I have made arrangements for you to stay at the Archbishop's Palace—that will be easier, I think, and more politic than putting you in with the Ducal family. His Grace the Archbishop knows that I am interested in this case; so does Sir Thomas Leseaux. No one else does."

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Lord Darcy raised an eyebrow. "Sir Thomas Leseaux, Sire? The theoretical thaumaturgist?"

The King's smile was that of a man who has perpetrated a successful surprise. "The same, my lord. A member of the Society of Albion—and my agent."

"Perfect, Sire," said Lord Darcy with a smile of appreciation. "One would hardly suspect a scientist of his standing of being either."

"I agree. Are there any further questions, my lord?"

"No. But I have a request, Sire. Sir Thomas, I understand, is not a practicing sorcerer—"

"Correct," said the King. "A theoretician only. He is perfecting something he calls the Theory of Subjective Congruency—whatever that may mean. He works entirely with the symbology of subjective algebra and leaves others to test his theories in practice."

Lord Darcy nodded. "Exactly, Sire. He could hardly be called an expert in forensic sorcery. I should like the aid of Master Sean O Lochlainn; we work well together, he and I. He is in Rouen at the moment. May I send word for him to come to Canterbury?"

His Majesty's smile grew broader. "I am happy to say that I have anticipated your request. I have already sent a teleson message to Dover. A trusted agent has already left on a special boat to Calais. He will teleson to Rouen and the boat will be held for Master Sean at Calais to return to Dover. From Dover, he can take the train to Canterbury. The weather is good; he should arrive some time tomorrow."

"Sire," said Lord Darcy, "as long as the Imperial Crown decorates a head like yours, the Empire cannot fail."

"Neatly worded, my lord. We thank you." His Majesty rose from his chair and Lord Darcy did likewise. His reversion to the royal first person plural indicated that they were no longer speaking as man to man, but as Sovereign to subject. "We give you carte blanche, my lord, but there must be no further contact with Us unless absolutely necessary. When you are finished, We want a complete and detailed report—for Our eyes only. Arrangements for anything you need will be made through His Grace the Archbishop."

"Very well, Your Majesty."

"You have Our leave to go, Lord Darcy."

"By Your Majesty's leave." Lord Darcy dropped to one knee. By the time he had risen, the King had turned his back and was once more staring out the window—making it unnecessary for Lord Darcy to back out of the room.

Lord Darcy turned and walked to the door. As his hand touched the door handle, the King's voice came again.

"One thing, Darcy."

Lord Darcy turned to look, but

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the King still had his back to him.

"Sire?"

"Watch yourself. I don't want you killed. I need men like you."

"Yes, Sire."

"Good luck, Darcy."

"Thank you, Sire."

Lord Darcy opened the door and went out, leaving the King alone with his thoughts.

Lord Darcy vaguely heard a bell. *Bon-n-n-ng. Bon-n-n-ng. Bon-n-n-ng.* Then a pause. During the pause, he drifted off again into sleep, but it was only a matter of seconds before the bell rang three more times. Lord Darcy came slightly more awake this time, but the second pause was almost enough to allow him to return to comfortable oblivion. At the third repetition of the three strokes, he recognized that the Angelus was ringing. It was six in the morning, and that meant that he had had exactly five hours sleep. During the final ringing of the nine strokes, he muttered the prayers rapidly, crossed himself, and closed his eyes again, resolving to go back to sleep until nine.

And, of course, couldn't sleep.

One eventually gets used to anything, he thought, feeling sleepily grumpy, *even great, clangy bells.* But the huge bronze monster in the bell tower of the cathedral church of Canterbury was not more than a hundred yards away in a direct line, and its sound made the very walls vibrate.

He pulled his head out of the pillows again, propped himself up to a sitting position, and looked around at the unfamiliar but pleasant bedroom which had been assigned him by His Grace the Archbishop. Then he looked out the window. At least the weather looked as if it would be fine.

He threw back the bedclothes, swung his legs over the edge of the bed, put his feet into his slippers, and then pulled the bell cord. He was just tying the cord of his crimson silk dressing gown—the one with the gold dragons embroidered on it—when the young monk opened the door. "Yes, my lord?"

"Just a pot of caffe and a little cream to match, Brother."

"Yes, my lord," the novice said.

By the time Lord Darcy had showered and shaved, the caffe was already waiting for him, and the young man in the Benedictine habit was standing by. "Anything else, my lord?"

"No, Brother; that will be all. Thank you."

"A pleasure, my lord." The novice went promptly.

That was one thing about the Benedictine novitiate, Lord Darcy reflected; it taught a young man from the lower classes how to behave like a gentleman and it taught humility to those who were gently born. There was no way of knowing whether the young man who had just come in was the son of a small farmer or a cadet of a noble family.

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If he hadn't been able to learn, he wouldn't have come even this far.

Lord Darcy sat down, sipped at the caffe, and thought. He had little enough information as yet. His Grace the Archbishop, a tall, widely-built, elderly man with an impressive mane of white hair and a kindly expression on his rather florid face, had had no more information than Lord Darcy had already received from the King. Via teleson, Lord Darcy had contacted Sir Angus MacReady, Chief Investigator for His Lordship the Marquis of Edinburgh. Lord Camberton had come to Scotland, all right; but it had not been for a holiday. He had not told Sir Angus what he was doing, but he had been engaged in investigative work of some kind. Sir Angus had promised to determine what that work had been. "Aye, m' laird," he'd said, "I'll do the job masel'. I'll no say a word tae anybody, and I'll report tae ye direct."

Whether Lord Camberton's investigations in Scotland had anything to do with the reason for his being killed was an open question. The Holy Society of Ancient Albion had very little following in Scotland, and the murder had almost certainly not taken place there. Taking a human body from Edinburgh to Canterbury would be so difficult that there would have to be a tremendous advantage to having the body found in Canterbury that would outweigh the dangers of transportation. He would not ignore the possibility, Lord Darcy decided, but until evidence appeared that made it more probable, he would look for the death spot closer to Canterbury.

The local Armsmen had definitely established that Lord Camberton had not been killed in the place where he was found. The deep stab wound had, according to the chirurgeon, bled copiously when it had been inflicted, but there was no blood in the Duke's casket. Still, he would have to investigate the cabinetmaker's shop himself; the report of the Armsmen, relayed to him through My Lord Archbishop, was not enough.

There would be no point in viewing the body itself until Master Sean arrived; that blue dye job had a definitely thaumaturgical feel about it, Lord Darcy thought.

Meantime, he would stroll over to the ducal castle and ask a few questions. But first, breakfast was definitely in order.

Master Walter Gotobed bowed and touched his forehead as the gentleman entered the door of his shop. "Yes, sir. What may I do for you, sir?"

"You are Walter Gotobed, Màster Joiner?" asked Lord Darcy.

"At your service, sir," said the old man politely.

"I am Lord Darcy, Special Investigator for His Majesty's Court of Chivalry. I should like a few

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moments of your time, Master Walter."

"Ah, yes. Certainly, your lordship." The old man's eyes took on a pained expression. "About Lord Camberton, I've no doubt. Will you come this way, your lordship? Yes. Poor Lord Camberton, murdered like that; an awful thing, your lordship. This is my office; we won't be disturbed here, your lordship. Would you care to take this chair, your lordship? Here, just a moment, your lordship, let me dust the sawdust off it. Sawdust *do* get everywhere, your lordship. Now, what was it your lordship wanted to know?"

"Lord Camberton's body was found here in your shop, I believe?" Lord Darcy asked.

"Ah, yes, your lordship, and a terrible thing it was, too, if I may say so. A terrible thing to have happen. Found him, so we did, in His Grace's coffin. The Healers had told me there wasn't much hope for His Grace, and Her Grace, the Duchess, asked me to make a specially nice one for His Grace, which of course I did, and yesterday morning when we came in, there he was, Lord Camberton, I mean, in the coffin where he didn't ought to be. All over blue he was, your lordship, all over blue. We didn't even recognize him because of that, not at first."

"Not an edifying sight, I dare say," Lord Darcy murmured. "Tell me what happened."

Master Walter did so, with exhausting particulars.

"You have no idea how he came here?" Lord Darcy asked when the recital was finished.

"None at all, your lordship; none at all. Chief Bertram asked us the same thing, your lordship, 'How did he get in here?' But none of us knew. The windows and the doors was all locked up tight and the back door barred. The only ones as has keys is me and my journeyman, Henry Lavender, and neither of us was here at all the night before. Chief Bertram thought maybe the 'prentices had put him in there as a practical joke—that was before Chief Bertram recognized who he was and thought they'd stole it from the Chirurgeon's College or something—but the boys swear they don't know nothing about it and I believe 'em, your lordship. They're good boys and they wouldn't pull anything like that on me. I said as much to Chief Bertram."

"I see," said Lord Darcy. "Just for the record, where were you and Journeyman Henry and the apprentices Sunday night?"

Master Walter jerked a thumb toward the ceiling. "Me and the boys were upstairs, your lordship. That's my home, and I have a room for my 'prentices. Goodwife Bailey comes in of a day to do the cleaning and fix the meals—my wife has been dead now these eighteen years, God rest her soul." He crossed himself unobtrusively.

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"Then you can come in the shop from upstairs?"

Master Walter pointed toward the wall of his office. "That ladder goes up to my bedroom, your lordship; you can see the trapdoor. But it hasn't been used for nigh on ten years now. My legs aren't what they used to be, and I don't fancy a ladder any more. We all use the stairway on the outside of the building."

"Could someone have used the ladder without your knowing it, Master Walter?"

The old man shook his head firmly. "Not without my knowing of it, your lordship. If I was down here, I'd see 'em. If I was upstairs, I'd hear 'em; they'd have to move my bed from off the trapdoor. Besides, I'm a very light sleeper. A man don't sleep as well when he's past threescore and ten as he did when he were a young man, your lordship."

"And the bolts and bars were all in place when you came down yesterday morning?"

"Indeed they were, your lordship. All locked up tight."

"Journeyman Henry had the other key, you say. Where was he?"

"He were at home, your lordship. Henry's married, has a lovely wife —a Tolliver she were afore she married, one of Ben Tolliver's daughters. That's Master Ben, the baker. Henry and his wife live outside the gates, your lordship, and the guard would have seen him if he'd come in, which he and his wife say he didn't and I believe 'em. And Henry would have no cause to do such a thing no more than the boys would."

"Have you had protective spells put on your locks and bars?" Lord Darcy asked.

"Oh, yes, your lordship; indeed I have. Wouldn't be without 'em, your lordship. The usual kind, your lordship; cost me a five-sovereign a year to have 'em kept up, but it's worth every bit."

"A licensed sorcerer, I trust? None of these hedge-magicians or witch-women?"

The old man looked shocked. "Oh, no, your lordship! Not I! I abides by the law, I do! Master Timothy has a license all right and proper, he do. Besides, the magic of them you mentioned is poor stuff at best. I don't believe none of the heresy about black magic being stronger nor white. That would be saying that the Devil were stronger nor God, and"—he crossed himself again—"I for one would never think such a thing."

"Of course not, Master Walter." Lord Darcy said soothingly. "You must understand that it is my duty to ask such questions. The place was all locked up tight, then?"

"Indeed, your lordship, indeed it was. Why, if it hadn't been that His Grace died in the night, Lord Camberton might have stayed there until this morning. But for that, we

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wouldn't have opened up the shop at all, it being a holiday and all."

"Holiday?" Lord Darcy looked at him questioningly. "What made the eighteenth of May a holiday?"

"Only in Canterbury, your lordship. Special day of thanksgiving it is. On that day in 1589—or '98, I misremember which—a band of assassins were smuggled into the castle by a traitor. Five of them there were. A plot to kill the Duke and his family, it were. But the plot were betrayed and the castle searched and all of 'em were found and taken before they could do anything. Hanged, they were, right out there in the courtyard." Master Walter pointed out the front of his shop. "Since then, on the anniversary, there's a day of thanksgiving for the saving of the Duke's life—though he died some years later, you understand. There's a special Mass said at the chapel and another at the cathedral, and the guard is turned out and there's a ceremonial searching of the castle, with all the Duke's Own Guard in full dress and a parade and a trooping of the colors and five effigies hanged in the courtyard and fireworks in the evening. Very colorful it is, your lordship."

"I'm sure it is," said Lord Darcy. Master Walter's recitation had recalled the facts of history to mind. "Was it carried out as usual yesterday?"

"Well, no, your lordship, it wasn't. The captain of the Duke's Own didn't think it would be right, what with the family in mourning and all. And My Lord Archbishop agreed. 'Twouldn't be proper to give thanks for the saving of the life of a Duke that's four centuries, nearly, in his grave with His late Grace not even *in* his grave yet. The guard was turned out for five minutes of silence and a salute to His Grace instead."

"Of course. That would be the proper thing," Lord Darcy agreed. "You would not have come into the shop until this morning, then, if His Grace had not passed away. When did you lock the shop last before you unlocked it yesterday morning?"

"Saturday evening, your lordship. That is, *I* didn't lock it. Henry did. I was a little tired and I went upstairs early. Henry usually locks up at night."

"Was the coffin empty at that time?" Lord Darcy asked.

"Positively, your lordship. I took special pride in that coffin, if I may say so, your lordship. Special pride. I wanted to make sure there weren't no sawdust or such on the satin lining."

"I understand. And at what o'clock did you lock up Saturday evening?"

"You'd best ask Henry, your lordship. *Henn-nry!*"

The journeyman appeared promptly. After the introduction, Lord Darcy repeated his question.

"I locked up at half past eight,

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your lordship. It were still light out. I sent the 'prentices upstairs and locked up tight."

"And no one came in here at all on Sunday?" Lord Darcy looked in turn at both men.

"No, your lordship," said Master Walter.

"Master Sean! Over here!"

"Ah! There you are, my lord! Good to see you again, my lord. Had a good holiday, I trust? What there was of it, I mean."

"To be honest, I was beginning to become a bit bored, my good Sean. I think this little problem is just what we both need to shake the cobwebs out of our brains. Come along; I have a cab waiting for us."

"Not a soul, your lordship," said Henry Lavender.

"Not a soul, perhaps," Lord Darcy said dryly. "But a body did."

Lord Darcy was waiting on the station platform when the 11:22 pulled in from Dover, and when a tubby little Irishman wearing the livery of the Duke of Normandy and carrying a large, symbol-decorated carpetbag stepped out of one of the coaches and looked around, Lord Darcy hailed him:

Once inside the cab, Lord Darcy began speaking in a low voice calculated to just barely carry above the clatter of the horses' hoofs and the rattle of the wheels. Master Sean O Lochlainn listened carefully while Lord Darcy brought him up to date on the death of the Duke and the murder of Lord Camberton, omitting nothing except the

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fact that the assignment had come personally from the King himself.

"I checked the locks in the shop," he concluded. "The rear door has a simple slip bar that couldn't be opened from the outside except magically. The same with the windows. Only the front door has a key. I'll want you to check the spells; I have a feeling that those men are telling the truth about locking up, that none of them had anything to do with the murder."

"Did you get the name of the sorcerer who serviced the locks, my lord?"

"A Master Timothy Videau."

"Aye. I'll look him up in the directory." Master Sean looked thoughtful. "I don't suppose there's anything suspicious about the death of His Grace the Duke, eh, my lord?"

"I am chronically suspicious of all deaths intimately connected with a murder case, Master Sean. But first we will have a look at Lord Camberton's body. It's being held in the mortuary at the Armsmen's Headquarters."

"Would it be possible, my lord, to instruct the cab driver to stop at an apothecary's shop before we get to the mortuary? I should like to get something."

"Certainly." Lord Darcy gave instructions, and the cab pulled up before a small shop. Master Sean went in and came out a few moments later with a small jar. It appeared to be filled with dried leaves. The whole ones were shaped rather like an arrowhead.

"Druidic magic, eh, Master Sean?" Lord Darcy asked.

Master Sean looked startled for a moment, then grinned. "I ought to be used to you by now, my lord. How did you know?"

"A blue-dyed corpse brings to mind the ancient Briton's habit of dying himself blue when he went into battle. When you go into an apothecary's shop and purchase a jar full of the typically sagittate leaves of the woad plant, I can see that your mind is running along the same lines that mine had. You intend to use the leaves for a similarity analysis."

"Correct, my lord."

A few minutes later, the cab drew up to the front door of the Armsmen's Headquarters, and shortly afterwards Lord Darcy and Master Sean were in the morgue. An attendant stood by while the two men inspected the late Lord Camberton's earthly husk.

"He was found this way, my lord? Naked?" Master Sean asked.

"So I am told," Lord Darcy said.

Master Sean opened his symbol-covered carpetbag and began taking things out of it. He was absorbed in his task of selecting the proper material for his work when Bertram Lightly, Chief Master-at-Arms of the City of Canterbury, entered. He did not bother Master Sean; one does not trouble a sorcerer when he is working.

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Chief Bertram was a round-faced, pink-skinned man with an expression that reminded one of an amiable frog. "I was told you were here, your lordship," he said softly. "I had to finish up some business in the office. Can I be of any assistance?"

"Not just at the moment, Chief Bertram, but I have no doubt that I shall need your assistance before this affair is over."

"Excuse me," said Master Sean without looking up from his work, "but did you have a chirurgeon look at the body, Chief Bertram?"

"Indeed we did, Master Sorcerer. Would you want to speak to him?"

"No. Not necessary at the moment. Just give me the gist of his findings."

"Well, Dr. Dell is of the opinion that his late lordship had been dead forty-eight to seventy-two hours—plus whatever time he was under a preservative spell, of course. Can't tell anything about that time lapse, naturally. Died of a stab wound in the back. A longish knife or a short thrust with a sword. Went in just below the left shoulder blade, between the ribs, and pierced the heart. Died within seconds."

"Did he say anything about bleeding?"

"Yes. He said there must have been quite a bit of blood from that stab. Quite a bit."

"Aye. So I should say. Look here, my lord."

Lord Darcy stepped closer.

"There was a preservative spell on the body, all right. It's gone now—worn off— but there's only traces of microorganisms on the surface. Nothing alive within. But the body was washed after the blood had coagulated, and it was dyed after it was washed. The wound is clean, and the dye is *in* the wound, as you see. Now, we'll see if that blue stuff is actually woad."

"Woad?" said Chief Bertram.

"Aye, woad," said Master Sean. "The Law of Similarity allows one to determine such things. The dye on the man may be exactly similar to the dye in the leaf, d'ye see. If it is, we get a reaction. Actually, all these come under the broad Law of Metonymy—an effect is similar to its cause, a symbol is similar to the thing symbolized. And vice versa, of course." Then he muttered something unintelligible under his breath and rubbed his thumb along the leaf of woad. "We'll see," he said softly. "We'll see." He put the leaf on the blue skin of the dead man's abdomen, then lifted it off again almost immediately. The side of the leaf that had touched the skin was blue. On the abdomen of the corpse was a white area, totally devoid of blueness, exactly the size and shape of the leaf.

"Woad," said Master Sean with complacency. "Definitely woad."

Master Sean was packing his materials away in his carpetbag.

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Half an hour had been sufficient to get all the data he needed. He dusted off his hands. "Ready to go, my lord?"

Lord Darcy nodded, and the two of them headed toward the door of the mortuary. Standing near the door was a smallish man in his middle fifties. He had graying hair, a lean face, mild blue eyes and a curiously hawklike nose. On the floor at his feet was a symbol-decorated carpet bag similar to Master Sean's own.

"Good day, colleague," he said in a high voice. "I am Master Timothy Videau." Then he gave a little bow. "Godd day, your lordship. I hope you don't mind, but I was interested in watching your procedure. Forensic sorcery has always interested me, although it isn't my field."

"I am Sean O Lochlainn," said the tubby little Irishman. "This is my superior, Lord Darcy."

"Yes, yes. So Chief Bertram informed me. Isn't it terrible? Lord Camberton being murdered that way, I mean."

As he talked, he fell into step with the other two men and walked with them toward the street. "I suppose you do a lot of similarity analysis in your work, Master Sean? It is a technique with which I am not at all familiar. Protective spells, avoidance spells, repairs—that's my work. Household work. Not as exciting as your work, but I like it. Gives a man a sense of satisfaction and all that. But I like to know what my colleagues are doing."

"You came down here to watch Master Sean at work, then, Master Timothy?" Lord Darcy asked in a bland voice, betraying no trace of the thoughts in his mind.

"Oh, no, your lordship. I was asked down by Chief Bertram." He looked at Master Sean and chuckled. "You'll get a laugh out of this, Master Sean. He wanted to know what it would cost to buy a preservator big enough to serve the kitchen in the Armsmen's barracks!"

Master Sean laughed softly, then said: "I dare say that when you told him he decided to stick with a good, old-fashioned icehouse. You're the local agent, then?"

"Yes. But there's not much profit in it yet, I fear. I've only sold one, and I'm not likely to sell any more. Much too expensive. I get a small commission, but the real money for me would be in the servicing. The spell has to be reinforced every six months or so."

Master Sean smiled ingratiatingly. "Sounds interesting. The spell must have an interesting structure."

Master Timothy returned the smile. "Yes, quite interesting. I'd like to discuss it with you . . ."

Master Sean's expression became more attentive.

". . . But unfortunately Master Simon has put the whole process under a seal of secrecy."

"I was afraid of that," Master Sean said with a sigh.

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"Would I be intruding if I asked what you two are talking about?" Lord Darcy asked.

"Oh, I'm sorry, my lord," Master Sean said hurriedly. "Just shop talk. Master Simon of London has invented a new principle for protecting food from spoilage. Instead of casting a spell on each individual item—such as the big vitners do with wine casks and the like—he discovered a way to cast a spell on a specially-constructed chest, so that anything put in it is safe from spoilage. The idea being that, instead of enchanting an *object*, a *space* is given the property necessary to do the same thing. But the process is still pretty expensive."

"I see," said Lord Darcy.

Master Sean caught the tone of his voice and said: "Well, we mustn't talk shop, Master Timothy. Er . . . did your lordship want me to have a look at those locks? Might be a good idea, if Master Timothy is free for an hour."

"Locks?" said Master Timothy.

Master Sean explained about the locks on the cabinetmaker's shop.

"Why, certainly, Master Sean," said Master Timothy. "I'd be glad to be of any assistance I can."

"Excellent," said Lord Darcy. "Come to My Lord Archbishop's Palace as soon as you have the data. And thank you for your assistance, Master Timothy."

"It's a pleasure to be of service, your lordship," said the hawk-nosed little sorcerer.

In a quiet sitting room in the palace, His Grace the Archbishop introduced Lord Darcy to a tall, lean man with pale features and light brown hair brushed straight back from a broad, high forehead. He had gray-blue eyes and an engaging smile.

"Lord Darcy," said the Archbishop, "may I present Sir Thomas Leseaux."

"It is a pleasure to meet your lordship," said Sir Thomas with a smile.

"The pleasure is mine," said Lord Darcy. "I have read with great interest your popularization, 'Symbolism, Mathetmatics, and Magic.' I am afraid your more technical work is beyond me."

"You are most kind, my lord."

"Unless you need me," said the Archbishop, "I shall leave you two gentlemen alone. I have some pressing matters at hand."

"Certainly, Your Grace," said Lord Darcy.

When the door had closed behind His Grace, Lord Darcy waved Sir Thomas to a chair. "No one knows you're meeting me here, I trust?" he said.

"Not if I can help it, my lord," said Sir Thomas. There was a wry smile on his lips and one eyebrow lifted slightly. "Aside from the fact that I might get my throat cut, I would lose my effectiveness as a double agent if the Brotherhood found that I was having an appointment with a King's Officer. I

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used the tunnel that goes from the crypt in the Cathedral to the Palace cellars to get here."

"You might have been seen going into the church."

"That wouldn't bother them, my lord," Sir Thomas said with a negligent flip of one hand. "Since the Society was outlawed, we're expected to dissemble. No use calling attention to oneself by staying away from church, even if we don't believe in Christianity." His smile twisted again. "After all, why not? If a man can be expected to pretend to belief in pagan Druidism, to verbally denounce the Christian faith in grubby little meetings of fanatics, then why shouldn't those pagans pretend to the Christian faith for the same reason—to cover up their real activities. The only difference is in whether one is on one side of the law or the other."

"I should think," said Lord Darcy, "that the difference would be in whether one was for or against King and Country."

"No, no." Sir Thomas shook his head briskly. "That's where you err, my lord. The Holy Society of Ancient Albion is as strongly for King and Country as you or I."

Lord Darcy reached into his belt pouch, took out a porcelain pipe and a package of tobacco, and began to fill the bowl. "Elucidate, Sir Thomas. I am eager to hear details of the Society—both operational data and theory."

"Theory, then, my lord. The Society is comprised of those who believe that these islands have a Destiny—with an upper-case D—to bring peace and contentment to all mankind. In order to do this, we must return to the practices and beliefs of the original inhabitants of the islands—the Keltic peoples who had them by right at the time of the Caesarian invasion of 55 B.C."

"*Were* the Kelts the aborigines of these islands?" Lord Darcy asked.

"My lord, bear with me," Sir Thomas said carefully. "I am trying to give you what the Society officially believes. In judging human behavior, one must go by what an individual *believes* is true—not by what is *actually* true."

Lord Darcy fired up his pipe and nodded. "I apologize. Continue."

"Thank you, my lord. These practices to which I refer are based upon a pantheistic theology. God is not just a Trinity, but an Infinity. The Christian outlook, they hold, is true but limited. God is One—true. He is more than Three in One, however; He is Infinity in One. They hold that the Christian belief in the Three Persons of God is as false—and as true—as the statement: 'There are three grains of sand on the beaches of England.'" He spread his hands. "The world is full of spirits—trees, rocks, animals, objects of all kinds—all full of . . . well, call it spirit for want of a better word. Further, each spirit is intelligent—often in ways that we

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can't fathom, but intelligent, nonetheless. Each is an individual, and may be anywhere on the spectrum from 'good' to 'evil'. Some are more powerful than others. Some, like dryads, are firmly linked to a specific piece of material, just as a man is linked to his body. Others are 'free spirits'—what we might call 'ghosts', 'demons,' and 'angels.' Some—most, in fact—can be controlled; some directly, some indirectly, through other spirits. They can be appeased, bribed, and threatened.

"Now the ancient Britons knew all the secrets for appeasing these spirits—or bribing or controlling them—whatever you want. So, it appears, do the Brotherhood of Druids—the inner circle of the Society. At least, so they tell the lesser members. Most of them are of The Blood, as they call it—people from Scotland, Ireland, Wales, Brittainy, the Orkneys, the Isle of Man, and so on. Pure Keltic—or so they claim. But those of Anglo-Saxon, Norman, or Frankish descent are allowed in occasionally. No others need apply.

"Don't get the idea they're not for Country, my lord. They are. We're meant to rule the world eventually. The King of the British Isles is destined to be ruler of an empire that will cover the globe. And the King himself? He's the protection, the hex shield, the countercharm that keeps the hordes of 'bad spirits' from taking over and making life miserable for everybody. The King keeps the storms in place, prevents earthquakes, keeps pestilence and plague away, and, in general, protects his subjects from harm.

"For King and for Country, my lord—but not in exactly the way you or I think of it.".

"Interesting," Lord Darcy said thoughtfully. "How do they explain away such things as the storms and frosts that *do* hit Britain?"

"Well, that's His Majesty's fault, you see," said Sir Thomas. "If the Sovereign does not comport himself properly, in other words, if he doesn't follow the Old Faith and do things by the Druidic rules, then the Evil Ones can get through the defenses."

"I see. And one of those rules is that His Majesty must allow his life to be taken any time the Brotherhood feels like it?"

"That's not quite fair, my lord," Sir Thomas said. "Not 'anytime they feel like it'—only when danger threatens. Or every seventh year, whichever comes first."

"What about other sacrifices?"

Sir Thomas frowned. "So far as I know, there have been no human deaths. But every one of their meetings involves the ritual killing of an animal of some kind. It depends upon the time of year and the purpose of the meeting, whether one animal or another is sacrificed."

"All of which is quite illegal," Lord Darcy said.

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"Quite," Sir Thomas said. "My dossiers and reports are all on file with His Grace the Archbishop. As soon as we have all the evidence we need, we will be able to make a clean sweep and round up the whole lot of them. Their pernicious doctrines have gone far enough."

"You speak with some heat, Sir Thomas."

"I do. Superstition, my lord, is the cause of much of the mental confusion among the lower classes. They see what is done every day by sorcerers using scientific processes and are led to believe in every sort of foolishness because they confuse superstition with science. That's why we have hedge magicians, black wizards, witches' and warlocks' covens, and all the rest of that criminal fraternity. A person becomes ill, and instead of going to a proper Healer, he goes to a witch, who may cover a wound with moldy bread and make meaningless incantations or give a patient with heart trouble a tea brewed of foxglove or some such herb which has no symbolic relationship to his trouble at all. Oh, I tell you, my lord, this sort of thing must be stamped out!"

The theoretician had dropped his attitude of bored irony. He evidently felt quite strongly about the matter, Lord Darcy decided. Licensed Healers, of course, used various herbs and drugs on occasion, but always with scientific precision according to the Laws of Magic; for the most part, however, they relied on the Laying on of Hands, the symbol of their Healing Art. A man took his life in his hands whenever he trusted his health to anyone but a priestly Healer or took his pains and ills to anyone who operated outside the Church.

"I have no doubt of the necessity of clearing up the whole Society, Sir Thomas," said Lord Darcy, "but unless you intend to notify His Majesty the King that the time to strike is near, I fear I cannot wait for the gathering in of the net. I am looking specifically for the murderer of Lord Camberton."

Sir Thomas stood up and thrust his hands into his coat pockets while he stared moodily at a tapestry on the wall. "I've been wondering about that ever since I heard of Lord Camberton's death."

"About what?"

"About the woad dye—I presume it *was* woad, my lord?"

"It was."

"It points clearly toward the Society, then. Some of the Inner Circle have the Talent—poorly trained and misused, but a definite Talent. There is nothing more pitiful in this world, my lord, than to see the Talent misused. It is criminal!"

Lord Darcy nodded in agreement. He knew the reason for Sir Thomas' anger. The theoretician did not, himself, possess the Talent to any marked degree. He theorized; others did his laboratory

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work. He proposed experiments; others, trained sorcerers, carried them out. And yet Sir Thomas wished passionately that he could do his own experimenting. To see another misuse what he himself did not have, Lord Darcy thought, must be painful indeed to Sir Thomas Leseaux.

"The trouble is," Sir Thomas went on, "that I can give you no clue. I know of no plot to kill Lord Camberton. I know of no reason why the Society should want him dead. That does not mean, of course, that no such reason exists."

"He was not, then, investigating any of the activities of the Society?"

"Not that I know of. Of course, he may have been investigating the private activities of someone connected with the Society."

Lord Darcy looked thoughtfully at the smoldering tobacco in the bowl of his pipe. "And that hypothetical someone used the resources of the Society to rid himself of whatever exposure Lord Camberton might have threatened?" he suggested.

"It's possible," Sir Thomas said. "But in that case the person would have to be rather high up in the Inner Circle. And even then I doubt that they would do murder for a private reason."

"It needn't have been a private reason. Suppose Camberton had found that someone in this city was a Polish agent, but did not know he was connected with the Society. Then what?"

"It's possible," Sir Thomas repeated. He turned away from his inspection of the tapestry and faced Lord Darcy. "If that were the case, then he and other Polish agents might do away with Lord Camberton. But that gets us no further along, my lord. After months of work, I still have no evidence that any one of the Inner Circle is, in fact, a Polish agent. Further, out of the seven members of the Inner Circle, there are still at least three I cannot identify at all."

"They remain hidden?"

"In a way. At the meetings, the members wear a white gown and hood, similar to a monastic habit, while the Inner Circle wear green gowns and hoods that completely cover the head, with a pair of eyeholes cut in them. No one knows who they are, presumably. I have positively identified four of them and am fairly certain of a fifth."

"Then why did you say there were at least three you could not identify? Why the qualification?"

Sir Thomas smiled. "They are shrewd men, my lord. Seven of them always appear for the functions. But there are more than seven. Possibly as many as a dozen. At any given meeting, seven wear green and the remainder wear white. They switch around, so that those not of the Inner Circle are led to believe that Master So-and-So is not a member of the Circle be-

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cause they have seen him at meetings wearing common white."

"I take it, then, that the complete membership never attends any given meeting," said Lord Darcy. "Otherwise the process of elimination would eventually give the whole trick away."

"Exactly, my lord. One is notified as to date, time, and place."

"Where do they usually take place?"

"In the woods, my lord. There are several groves nearby. Perfectly safe. There are guards posted round the meeting, ready to sound the alarm if Men-at-Arms should come. And no ordinary person would come anywhere near or say a word about it to the King's Officers; they're frightened to death of the Society."

"You say there are always seven. Why seven, I wonder?"

Sir Thomas gave a sardonic chuckle. "Superstition again, my lord. It is supposed to be a mystic number. Any apprentice sorcerer could tell them that only the number five has any universal symbolic significance."

"So I understand," said Lord Darcy. "Inanimate nature tends to avoid fiveness."

"Precisely, my lord. There are no five-sided crystals. Even the duodecahedron, a regular solid with twelve pentagonal faces, does not occur naturally. I will not bore you with abstruse mathematics, but if my latest theorems hold true, the hypothetical 'basic building blocks' of the material universe—whatever they may be—cannot occur in aggregates of five. A universe made of such aggregates would go to pieces in a minute fraction of a second." He smiled. "Of course such 'building blocks', if they exist, must remain forever hypothetical, since they would have to be so small that no one could see them under the most powerful microscope. As well try to see a mathematical point on a mathematical line. These are symbolic abstractions which are all very well to work with, but their material existence is highly doubtful."

"I understand. But then living things—?"

"Living things show fiveness. The starfish. Many flowers. The fingers and toes of the human extremities. Five is a very potent number to work with, my lord, as witness the use of the pentacle or pentagram in many branches of thaumaturgy. Six also has its uses; the word 'hex' comes from 'hexagon', as in the Seal of Solomon. But that is because of the prevalence of the hexagon in nature, both animate and inanimate. Snowflakes, honeycombs, and so on. It hasn't the power of five, but it is useful. Seven, however, is almost worthless; its usefulness is so limited as to be nearly nil. Its use in the Book of the Apocalypse of St. John the Divine is a verbal symbology which—" He

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stopped abruptly with a wry smile. "Pardon me, my lord. I find that I tend to fall into a pedagogical pattern if I don't watch myself."

"Not at all. I am interested," Lord Darcy said. "The question I have in mind, however, is this: Is it possible that Lord Camberton was the victim of some bizarre sacrificial rite?"

"I . . . don't . . . know." Sir Thomas spoke slowly, thoughtfully. He frowned for a moment in thought, then said: "It's possible, I suppose. But it would indicate that Lord Camberton himself was a member of the Inner Circle."

"How so?"

"He would have had to go *willingly* to his death. Otherwise the sacrifice would be worthless. Granted, there has been an attempt of late—fomented by Polish agents—to make an exception in the case of the King. But it hasn't taken hold very strongly. Most of these people, my lord, are misguided fanatics—but they are quite sincere. To change a tenet like that is not as easy as King Casimir IX seems to think. If His Slavonic Majesty were to be told that a marriage, in which the bride was forced to make her responses against her will at gunpoint, was a true sacrament, he would be shocked that anyone could believe such a thing. And yet he seems to think that believers in Druidism can be manipulated into believing something non-Druidic very easily. His Slavonic Majesty is not a fool, but he has his blind spots."

"Is it possible, then," Lord Darcy asked, "that Camberton *was* one of the Inner Circle?"

"I really don't think he was, my lord, but it's certainly possible. Perhaps it would be of benefit to look over my written reports. My Lord Archbishop has copies of all of them."

"An excellent idea, Sir Thomas," said Lord Darcy, rising from his chair. "I want a list of known members and a list of those you suspect." He glanced at his watch. He had two and a half hours yet before his appointment with the family of the late Duke of Kent. That should be time enough.

"This way, your lordship. Their Graces and Sir Andrew will see you *now*," said the liveried footman. Lord Darcy was escorted down a long hallway toward the room where the family of the late Duke awaited him.

Lord Darcy had met the Duke, his wife, and his son socially. He had not met either the daughter, Lady Anne, or the Duchess' brother, Sir Andrew Campbell-MacDonald.

De Kent himself had been a kindly but austere, rather humorless man, strict in morals but neither harsh nor unforgiving. He had been respected and honored throughout the Empire and especially in his own duchy.

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Margaret, Duchess of Kent, was some twenty years younger than her husband, having married the Duke in 1944, when she was twenty-one. She was the second child and only daughter of the late Sir Austin Campbell-MacDonald. Vivacious, witty, clever, intelligent, and still a very handsome woman, she had, for two decades, been a spark of action and life playing before the quieter, more subdued background of her husband. She liked gay parties, good wines, and good food. She enjoyed dancing and riding. She was a member of The Wardens, one of the few women members of that famous London gambling club.

Nonetheless, no breath of scandal had ever touched her. She had carefully avoided any situation that might cast any suspicion of immoral behavior or wrongdoing upon either herself or her family.

There had been two children born of the union: Lord Quentin, nineteen, was the son and heir. Lady Anne, sixteen, was still a schoolgirl, but, according to what Lord Darcy had heard, she was already a beautiful young lady. Both children showed the vivaciousness of their mother, but were quite well-behaved.

The Duchess of Kent's brother, Sir Andrew, was, by repute, an easy-going, charming, witty man who had spent nearly twenty-five years in New England, the northern continent of the New World, and now, nearing fifty, he had been back in England for some five years.

The Dowager Duchess was seated in a brocaded chair. She was a handsome woman with a figure that maturity had ripened but not overpadded and rich auburn hair that showed no touch of gray. The expression on her face showed that she had been under a strain, but her eyes were clear.

Her son, Lord Quentin, stood tall, straight and somber by her side. Heir Apparent to the Ducal Throne of Kent, he was already allowed to assume the courtesy titles of "Your Grace" and "My Lord Duke", although he could not assume control of the government unless and until his position was confirmed by the King.

Standing a short, respectful distance away was Sir Andrew Campbell-MacDonald.

Lord Darcy bowed. "Your Grace Sir Andrew, I am grieved that we should have to meet again under these circumstances. I was, as you know, long an admirer of His Late Grace."

"You are most kind, my lord," said the Dowager Duchess.

"I am further grieved," Lord Darcy continued, "that I must come here in an official capacity as well as in a personal capacity to pay my respects to His Late Grace."

Young Lord Quentin cleared his throat a little. "No apologies are necessary, my lord. We understand your duty."

"Thank you, Your Grace. I will

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begin, then, by asking when was the last time any of you saw Lord Camberton alive."

"About three weeks ago," said Lord Quentin. "The latter part of April. He went to Scotland for a holiday."

The Dowager Duchess nodded. "It was a Saturday. That would have been the twenty-fifth."

"That's right," the young Duke agreed. "The twenty-fifth of April. None of us has seen him since. Not alive, I mean. I identified the body positively for the Chief Master-at-Arms."

"I see. Does any of you know of any reason why anyone would want to do away with Lord Camberton?"

Lord Quentin blinked. Before he could say anything, his mother said: "Certainly not. Lord Camberton was a fine and wonderful man."

Lord Quentin's face cleared. "Of course he was. I know of no reason why anyone should want to take his life."

"If I may say so, my lords," said Sir Andrew, "Lord Camberton had, I believe, turned many a malefactor over to the mercies of the King's Justice. I have heard that he was threatened with violence on more than one such occasion, threatened by men who were sentenced to prison after their crimes were uncovered through his efforts. Is it not possible that such a person may have carried out his threat?"

"Eminently possible," Lord Darcy agreed. He had already spoken to Chief Bertram about investigations along those lines. It was routine in the investigation of the death of an Officer of the King's Justice. "That may very likely be the explanation. But I am, naturally, bound to explore every avenue of investigation."

"You are not suggesting, my lord," the Dowager Duchess said coldly, "that anyone of the House of Kent was involved in this dreadful crime?"

"I suggest nothing,, Your Grace," Lord Darcy replied. "It is not my place to suggest; it is my duty to discover facts. When all the facts have been brought to light, there will be no need to make suggestions or innuendoes. The truth, whatever it may be, always points in the right direction."

"Of course," said the Duchess softly. "You must forgive me, my lord; I am overwrought."

"You must forgive my sister, my lord," Sir Andrew said smoothly, "her nerves are not of the best."

"I can speak for myself, Andrew," the Dowager Duchess said, closing her eyes for a moment. "But my brother is right, Lord Darcy," she added. "I have not been well of late."

"Pray forgive me, Your Grace," Lord Darcy said gently. "I have no desire to upset you at so trying a time. I think I have no further questions at the moment. Consider my official duties to be at an end

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for the time being. Is there any way in which I can serve you personally?"

She closed her eyes again. "Not at the moment, my lord, though it is most kind of you to offer. Quentin?"

"Nothing at the moment," Lord Quentin repeated. "If there is any way in which you can help, my lord, rest assured that I will inform you."

"Then, with Your Graces' permission, I shall take my leave. Again, my apologies."

As he walked down the corridor that led toward the great doorway, escorted by the seneschal, Lord Darcy was suddenly confronted by a young girl who stepped out of a nearby doorway. He recognized her immediately; the resemblance to her mother was strong.

"Lord Darcy?" she said in a clear young voice. "I am Lady Anne." She offered her hand.

Lord Darcy smiled just a little and bowed. The kissing of young ladies' hands was now considered a bit old-fashioned, but Lady Anne, at sixteen, evidently felt quite grown up and wanted to show it.

But when he took her hand, he knew that was not the reason. He touched his lips to the back of her hand. "I am honored, my lady," he said as he dexterously palmed the folded paper she had held.

"I am sorry I could not welcome you, my lord," she said calmly, "but I have not been well. I have a terrible headache."

"Perfectly all right, my lady. I trust you will soon be feeling better."

"Thank you, my lord. Until then —" And she walked on past him. Lord Darcy went on without turning, but he knew that one of the three he had left in the room behind him had opened the door and observed the exchange between himself and Lady Anne.

Not until he had left the main gates of the Ducal Palace did he look at the slip of paper.

It said:

"My lord, I must speak with you. Meet me at the Cathedral, near the Shrine of St. Thomas, at six. *Please!*"

It was signed "Anne of Kent."

At five thirty, Lord Darcy was sitting in his rooms in the archiepiscopal palace listening to Master Sean make his report.

"Master Timothy and I checked the locks and bars on the cabinetmaker's shop doors and windows, just as you instructed, my lord. Good spells they are, my lord; solid, competent work. Of course, I could have opened any one of 'em myself, but it would take a sorcerer who knew his stuff. No ordinary thief could have done it, nor an amateur sorcerer."

"What condition are they in, then?" Lord Darcy asked.

"As far as Master Timothy and myself could tell, not a one of 'em had been broken. O' course, that

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doesn't mean that they hadn't been tampered with. Just as a good locksmith can open a lock and relock it again without leaving any trace, so a good sorcerer could have opened those spells and re-set 'em without leaving a trace. But it would take a top-flight man, my lord."

"Indeed." Lord Darcy looked thoughtful. "Have you checked the Guild Register, Sean?"

Master Dean smiled. "First thing I did, my lord. According to the Register of the Sorcerer's Guild, there is only one man in Canterbury who has the necessary skill to do the job—aside from meself, that is."

"That exception is always granted, my good Sean," said Lord Darcy with a smile. "Only one? Then obviously—"

"Exactly, my lord. Master Timothy himself."

Lord Darcy nodded with satisfaction and tapped the dottle from his pipe. "Very good. I will see you later, Master Sean. I must do a little more investigating. We need more facts."

"Where are you going to look for them, my lord?"

"In church, Master Sean; in church."

As his lordship walked out, Master Sean gazed after him in perplexity. What had he meant by that?

"Maybe," Master Sean murmured to himself, half in jest, "he's going to pray that the Almighty will tell him who did it."

The cathedral was almost empty. Two women were praying at the magnificently jeweled Shrine of St. Thomas Becket, and there were a few more people at other shrines. In spite of the late evening sun, the ancient church was dim within; the sun's rays came through the stained glass windows almost horizontally, illuminating the walls but leaving the floor in comparative darkness.

St. Thomas was still a popular saint. The issues for which he had fought and died eight centuries before were very dead issues indeed. Even the question of whether Henry II, the first Plantagenet King, had been intentionally involved in the death of Archbishop Thomas was now of interest only to historians and would probably never be settled. After his near-death from a crossbow bolt at the Siege of Chaluz, Richard the Lion Hearted had taken pains to exonerate his father, even though he had fought with old Henry till the day of his death. Young Arthur—the "Good King Arthur" who was so often confused in popular legend with Arthur of Camelot—had, as grandson of Henry II, probably done a bit of whitewashing, too. It matters little now. Arthur's decendants, including the present John IV, held on to the Empire that Henry had founded.

Henry II had his place in history as Thomas had his in Heaven.

As he neared the shrine, Lord Darcy saw that one of the two kneeling women was Lady Anne.

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He stopped a few yards away and waited. When the girl rose from prayer, she looked around, saw Lord Darcy, and came directly toward him.

"Thank you for coming, my lord," she said in a low voice. "I'm sorry I had to meet you this way. The family thought it would be better for me not to talk to you because they think I'm being a silly hero-worshiping girl. But that's not so, really—though I *do* think you're just wonderful." She was looking up at him with wide gray eyes. "You see, my lord, I know all about you. Lady Yvonne is a schoolmate of mine. She says you're the best Investigator in the Empire."

"I try to be, my lady," Lord Darcy said. He had not spoken more than a score of words to Yvonne, daughter of the Marquis of Rouen, but evidently she had been smitten by a schoolgirl crush—and from the look in Lady Anne's eyes, the disease was contagious.

"I think the sooner you solve the murder of Lord Camberton, the better for everyone, don't you?" Lady Anne asked. "I prayed to St. Thomas to help you. He ought to know something about murders, oughtn't he?"

"I should think so, yes, my lady," Lord Darcy admitted. "Do you feel that I will need special intercession by St. Thomas to solve this problem?"

Lady Anne blinked, startled—then she saw the gleam of humor in the tall man's steel-gray eyes. She smiled back. "I don't think so, my lord, but one should never take things for granted. Besides, St. Thomas won't help you unless you really need it."

"I blush, my lady," Lord Darcy said without doing so. "I assure you there is no professional jealousy between St. Thomas and myself. Since I work in the interests of justice, Heavenly intervention often comes to my assistance, whether I ask for it or not."

Looking suddenly serious, she said: "Does Heaven never interfere with your work? In the interest of Divine Mercy, I mean?"

"Perhaps, sometimes," Lord Darcy admitted somberly. "But I should not call it 'interference'; I should call it, rather, an 'illumination of compassion'—if you follow me, my lady."

She nodded. "I think I do. Yes, I think I do. I'm glad to hear you say so, my lord."

The thought flashed through Lord Darcy's mind that Lady Anne suspected someone—someone she hoped would not be punished. But was that necessarily true? Might it not simply be compassion on her own part?

Wait and see, Lord Darcy cautioned himself. *Wait and see.*

"The reason I wanted to talk to you, my lord," Lady Anne said in a low voice, "is that I think I found a Clue."

Lord Darcy could almost hear

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the capital letter. "Indeed, my lady? Tell me about it."

"Well, *two* Clues, really," she said, dropping her voice still further to a conspiratorical whisper. "The first one is something I saw. I saw Lord Camberton on the night of the eleventh, last Monday, when he came back from Scotland."

"Come, this is most gratifying!" Lord Darcy's voice was a brisk whisper. "When and where, my lady?"

"At the castle, at home. It was very late—nearly midnight, for the bells struck shortly afterward. I couldn't sleep. Father was so ill, and I—" She stopped and swallowed, forcing back tears. "I was worried and couldn't sleep. I was looking out the window—my rooms are on the second floor—and I saw him come in the side entrance. There's a gas lamp there that burns all night. I saw his face clearly."

"Do you know what he did after he came in?"

"I don't know, my lord. I thought nothing of it. I stayed in my rooms and finally went to sleep."

"Did you ever see Lord Camberton alive again?"

"No, my lord. Nor dead either, if it comes to that. Was he *really* painted blue, my lord?"

"Yes, my lady, he was." He paused, then: "What was the other clue, my lady?"

"Well, I don't know if it means anything. I'll leave that for you to judge. Last Monday night, when Lord Camberton came home, he was carrying a green cloak folded across his arm. I noticed it particularly because he was wearing a dark blue cloak and I wondered why he needed two cloaks."

Lord Darcy's eyes narrowed just a trifle. "And—?"

"And yesterday . . . well, I wasn't feeling very well, you understand, my lord. My Father and I were very close, my lord, and—" Again she stopped for a moment to fight back tears. "At any rate, I was just walking through the halls. I wanted to be alone for a while. I was in the West Wing. It's unused, except for guests, and there's no one there at the present time. I smelled smoke—a funny odor, not like wood or coal burning. I tracked the smell to one of the guest rooms. Someone had built a fire in the fireplace, and I thought that was odd, for yesterday was quite mild and sunny, like today. There was still smoke coming from the ashes, though they had been all stirred up. The smoke smelled like cloth burning, and I thought *that* was very odd, too, so I poked about a bit—and I found *this!*" With a flourish, she took something from the purse at her belt, holding it out to Lord Darcy between thumb and forefinger.

"I think, my lord, that one of the servants at the castle knows something about Lord Camberton's murder!"

She was holding a small piece of green cloth, burnt at the edges.

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Master Sean O Lochlainn came into Lord Darcy's room bearing a large box under one arm and a beaming smile on his round Irish face. "I found some, my lord!" he said triumphantly. "One of the draper's shops had a barrel of it. Almost the same color, too."

"Will it work, then?" Lord Darcy asked.

"Aye, my lord." He set the box on the nearby table. "It'll take a bit o' doing, but we'll get the results you want. By the by, my lord, I stopped by the hospital at the abbey and spoke to the Healer who performed the autopsy on His late Grace, the Duke. The good Father and the chirurgeon who assisted both agree: His Grace died of natural causes. No traces of poison."

"Excellent! A natural death fits my hypothesis much better than a subtle murder would have." He pointed at the box that Master Sean had put on the table. "Let's have a look at this floc."

Master Sean obediently opened the box. It was filled to the brim with several pounds of fine green fuzz. "That's floc, my lord. It's finely-chopped linen, such as that bit of cloth was made of. It's just lint, is all it is. But it's the only thing that'll serve our purpose." He looked around and spotted the piece of equipment he was looking for. "Ah! I see you got the tumbling barrel."

"Yes. My Lord Archbishop was good enough to have one of his coopers make it for us."

The device was a small barrel, with a volume of perhaps a dozen gallons, with a crank at one end, and mounted in a frame so that turning the crank would cause the barrel to rotate. The other end of the barrel was fitted with a tight lid.

Master Sean went over to the closet and took out his large, symbol-decorated carpet bag. He put it on the table and began taking various objects out of it. "Now, this is quite a long process, my lord. Not the simplest thing in the world by any means. Master Timothy Videau prides himself on being able to join a rip in a piece of cloth so that the seam can't be found, but that's a simple bit of magic compared to a job like this. There, all he has to do is make use of the Law of Relevance, and the two edges of a rip in cloth have such high relevance to each other that the job's a snap.

"But this floc, d'ye see, has no direct relevance to the bit o' cloth at all. For this, we have to use the Law of Synecdoche, which says that the part is equivalent to the whole—and contrariwise. Now, let's see. Is everything dry?"

As he spoke, he worked, getting out the instruments and materials he needed for the spells he was about to cast.

It was always a pleasure for Lord Darcy to watch Master Sean at work and listen to his detailed explanations of each step. He had heard much of it countless times

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before, but there was always something new to be learned each time, something to be stored away in the memory for future reference. Not, of course, that Lord Darcy could make direct use of it himself; he had neither the Talent nor the inclination. But in his line of work, every bit of pertinent knowledge was useful.

"Now, you've seen, my lord," Master Sean went on, "how a bit of amber will pick up little pieces of lint or paper if you rub it with a piece of wool first, or a glass rod will do the same if you rub it with silk. Well, this is much the same process, basically, but it requires patterning and concentration of the power, d'ye see. That's the difficult part. Now, I must have absolute silence for a bit, my lord."

It took the better part of an hour for Master Sean to get the entire experiment prepared to his satisfaction. He dusted the floc and the bit of scorched cloth with powders, muttered incantations, and made symbolic designs in the air with his wand. During it all, Lord Darcy sat in utter silence. It is dangerous to disturb a magician at work.

Finally, Master Sean dumped the box of floc into the barrel and put the bit of green cloth in with the fluffy lint. He clamped the cover on and made more symbolic tracings with his wand while he spoke in a low tone.

Then he said: "Now comes the tedious part, my lord. This is pretty fine floc, but that barrel will still have to be turned for an hour and a half at least. It's a matter of probability, my lord. The damaged edges of the cloth will try to find a bit of floc that is most nearly identical to the one that was there previously. Then that bit of floc finds another that was most like the next one and so on. Now, it's a rule that the finer things are divided, the more nearly identical they become. It is theorized that if a pure substance, such as salt, were to be reduced to its ultimate particles, they'd all be identical. In a gas—but that's neither here nor there. The point is that if I had used, say, pieces of half-inch green thread, I'd have to use tons of the stuff and the tumbling would take days. I won't bore you with the mathematics of the thing. Anyhow, this will take time, so—"

Lord Darcy smiled and raised a hand. "Patience, my dear Sean. I have anticipated you." He thought of how the King had done the same to him only the day before. He pulled a bell rope.

A knock came at the door and when Lord Darcy said "Come in" a young monk clad in novice's robes entered timidly.

"Brother Daniel, I think?" said his lordship.

"Y-yes, my lord."

"Brother Daniel, this is Master Sean. Master Sean, the Novice Master informs me that Brother Daniel is guilty of a minor infraction of the

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rules of his Order. His punishment is to be a couple of hours of monotonous work. Since you are a licensed sorcerer, and therefore privileged, it is lawful for a lay brother to accept punishment from you if he so wills it. What say you, Brother Daniel?"

"Whatever my lord says," the youth said humbly.

"Excellent. I leave Brother Daniel to your care, Master Sean. I shall return in two hours. Will that be plenty of time?"

"Plenty, my lord. Sit down on this stool, Brother. All you have to do is turn this crank—slowly, gently, but steadily. Like this. That's it. Fine. Now, no talking. I'll see you later, my lord."

When Lord Darcy returned, he was accompanied by Sir Thomas Leseaux. Brother Daniel was thanked and dismissed from his labors.

"Are we ready, Master Sean?" Lord Darcy asked.

"Ready, indeed, my lord. Let's have a look at it, shall we?"

Lord Darcy and Sir Thomas watched with interest as Master Sean opened the end of the barrel.

The tubby little sorcerer drew on a pair of thin leather gloves. "Can't get it damp, you see," he said as he put his hands into the end of the wooden cylinder, "nor let it touch metal. Falls apart if you do. Come out, now . . . easy . . . easy . . . ahhhhh!"

Even as he drew it out, tiny bits of floc floated away from the delicate web of cloth he held. For what he held was no longer a mass of undifferentiated floc; it had acquired texture and form. It was a long robe of rather fuzzy green linen, with an attached hood. There were eyeholes in the front of the hood so that if it were brought down over the head the wearer could still see out.

Carefully, the round little Irish sorcerer put the reconstituted robe on the table. Lord Darcy and Sir Thomas looked at it without touching it.

"No question of it," Sir Thomas said after a moment. "The original piece came from one of the costumes worn by the Seven of the Society of Albion." Then he looked at the sorcerer. "A beautiful bit of work, Master Sorcerer. I don't believe I've ever seen a finer reconstruction. Most of them fall apart if one tries to lift them. How strong is it?"

"About that of a soft tissue paper, sir. Fortunately, the weather has been dry lately. In damp weather"—he smiled—"well, it's more like damp tissue paper."

"Elegantly put, Master Sean," said Sir Thomas with a smile.

"Thank you, Sir Thomas." Master Sean whipped out a tape measure and proceeded to go over the reconstituted garment carefully, jotting down the numbers in his notebook. When he was through,

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he looked at Lord Darcy. "That's about it, my lord. Will we be needing it any further?"

"I think not. In itself it does not constitute evidence; besides, it would dissolve long before we could take it to court."

"That's so, my lord." He picked up the flimsy garment by the left shoulder, where the original scrap of material was located, and lowered most of the hooded cloak into the box which had held the floc. Then, still holding to the original bit of cloth with gloved thumb and forefinger, he touched the main body of the cloak with a silver wand. With startling suddenness, the material slumped into a pile of formless lint again, leaving the original cloth scrap in Master Sean's fingers.

"I'll file this away, my lord," he said.

Three days later, on Friday the twenty-second, Lord Darcy found himself becoming impatient. He wrote more on the first draft of the report which would eventually be sent to His Majesty and reviewed what he had already written. He didn't like it. Nothing new had come up. No new clues, no new information of any kind. He was still waiting for a report from Sir Angus MacReady in Edinburgh, hoping that would clear matters up. So far, nothing.

His late Grace, the Duke of Kent had been buried on Thursday, with My Lord Archbishop officiating at the Requiem Mass. Half the nobility of the Empire had been there, as had His Majesty. And Lord Darcy had induced My Lord Archbishop to allow him to sit in choir in the sanctuary so that he could watch the faces of those who came. Those faces had told him almost nothing.

Sir Thomas Leseaux had information that showed that either Lord Camberton himself or Sir Andrew Campbell-MacDonald or both were very likely members of the Society of Albion. But that proved nothing; it was extremely possible that one or both might have been agents sent in by the Duke himself.

"The question, good Sean," he had said to the tubby little Irish sorcerer on Thursday afternoon, "remains as it was on Monday. Who killed Lord Camberton and why? We have a great deal of data, but they are, thus far, unexplained data. Why was Lord Camberton placed in the Duke's coffin? When was he time he was killed and the time he killed? Where was he between the was found?

"Why was Lord Camberton carrying a green costume? Was it the same one that was burnt on Monday? If so, why did whoever burnt it wait until Monday afternoon to destroy it? The green habit would have fit either Lord Camberton or Sir Andrew, both of whom are tall men. It certainly did not belong to any of the de Kents; the tallest is Lord Quentin, and he is a good six

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inches too short to have worn that outfit without tripping all over the hem.

"I am deeply suspicious, Sean; I don't like the way the evidence is pointing."

"I don't quite follow you, my lord," Master Sean had said.

"Attend. You have been out in the city; you have heard what people are saying. You have seen the editorials in the *Canterbury Herald*. The people are convinced that Lord Camberton was murdered by the Society of Albion. The clue of the woad was not wasted upon Goodman Smith, the proverbial average man.

"And what is the result? The members of the Society are half scared to death. Most of them are pretty harmless people, in the long run; belonging to an illegal organization gives them the naughty feeling a little boy gets when he's stealing apples. But now the Christian community is up in arms against the pagans, demanding that something be done. Not just here, but all over England, Scotland, and Wales.

"Lord Camberton wasn't killed as a sacrifice, willing or otherwise. He'd have been disposed of elsewhere—buried in the woods, most likely.

"He was killed somewhere inside the curtain wall of Castle Canterbury, and it was murder—not sacrifice. Then why the woad?"

"As a preservative spell, my Lord," Master Sean had said. "The ancient Britons knew enough about symbolism to realize that the arrowhead leaves of the woad plant could be used protectively. They wore woad into battle. What they didn't know, of course, was that the protective spells don't work that way. They—"

"Would you use woad for a protective spell, as a preservative to prevent decomposition of a body?" interrupted Lord Darcy.

"Why. . . no, my lord. There are much better spells, as you know. Any woad spell would take quite a long time, and the body has to be thoroughly covered. Besides, such spells aren't very efficient."

"Then why was it used?"

"Ah! I see your point, my lord!" Master Sean's broad Irish face had suddenly come all over smiles. "Of course! The body was *meant* to be found! The woad was used to throw the blame on the Holy Society of Ancient Albion and divert suspicion from somewhere else. Or, possibly, the entire purpose of the murder was to give the Society a bad time, eh?"

"Both hypotheses have their good points, Master Sean, but we still do not have enough data. We need *facts*, my good Sean. *Facts!*"

And now, nearly twenty-four hours had passed and no new facts had come to light. Lord Darcy dipped his pen in the ink bottle and wrote down that disheartening fact.

The door opened and Master

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Sean came in, followed almost immediately by a young novice bearing a tray which contained the light luncheon his lordship had asked for. Lord Darcy pushed his papers to one side to indicate where the tray should be placed. Master Sean held out an envelope in one hand. "Special delivery, my lord. From Sir Angus MacReady in Edinburgh."

Lord Darcy reached eagerly for the envelope.

What happened was no one's fault, really. Three people were crowded around the table, each trying to do something, and the young novice, in trying to maneuver the tray, had to move it aside when Master Sean handed over the envelope to Lord Darcy. The corner of the tray caught the neck of the ink bottle, and that theretofore upright little container promptly toppled over on its side and disgorged its contents all over the manuscript Lord Darcy had been working on.

There was a moment of stunned silence, broken by the profuse apologies of the novice. Lord Darcy inhaled slowly, then calmly told the lad that there was no damage done, that he was certainly not at fault, and that Lord Darcy was not the least bit angry. He was thanked for bringing up the tray and dismissed.

"And don't worry about the mess, Brother," Master Sean said. "I shall clean it up myself."

When the novice had left, Lord Darcy looked ruefully at the ink-stained sheets and then at the envelope he had taken from Master Sean's fingers. "My good Sean," he said quietly, "I am not, as you know, a nervous or excitable man. If, however, this envelope does not contain good news and useful information, I shall undoubtedly throw myself on the floor in a raving convulsion of pure fury and chew holes in the rug."

"I shouldn't blame you in the least, my lord," said Master Sean, who knew perfectly well that his lordship would do no such thing. "Go sit down in the easy-chair, my lord, while I do something about this minor catastrophe."

Lord Darcy sat in the big chair near the window. Master Sean brought over the tray and put it on the small table at his lordship's elbow. Lord Darcy munched a sandwich and drank a cup of caffe while he read the report from Edinburgh.

Lord Camberton's movements in Scotland, while not exactly done in a blaze of publicity, had not been gone about furtively by any means. He had gone to certain places and asked certain questions and looked at certain records. Sir Angus had followed that trail and learned what Lord Camberton had learned, although he confessed that he had no notion of what his late lordship had intended to do with that information or what hypothesis he may have been working on or whether the information he had obtained meant anything, even to Lord Camberton.

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His lordship had visited, among other places, the Public Records Office and the Church Marriage Register. He had been checking on Margaret Campbell-MacDonald, the present Dowager Duchess of Kent.

In 1941, when she was only nineteen, she had married a man named Chester Lowell, a man of most unsavory antecedents. His father had been imprisoned for a time for embezzlement and had finally drowned under mysterious circumstances. Chester's younger brother, Ian, had been arrested and tried twice on charges of practicing magic without a license, but had been released both times after a verdict of "Not Proven", and had finally gone up for six years for a confidence game which had involved illegal magic and had been released in 1959. Chester Lowell himself was a gambler of the worst sort, a man who cheated at cards and dice to keep his pockets lined.

After only three weeks of marriage, Margaret had left Chester Lowell and returned home. Evidently the loss had meant little to Lowell; he did not bother to try to get her back. Six months later, he had fled to Spain under a cloud of suspicion; the authorities in Scotland believed that he had been connected with the disappearance of six thousand sovereigns from a banking house in Glasgow. The evidence against him, however, was not strong enough to extradite him from the protection of the King of Aragon. In 1942, the Aragonese authorities reported that the "Inglés", Chester Lowell, had been shot to death in Zaragoza after an argument over a card game. The Scottish authorities sent an investigator who knew Lowell to identify the body, and the case against him was marked "Closed".

So! thought Lord Darcy, *Margaret de Kent is twice a widow.*

There had been no children born of her brief union with Lowell. In 1944, after an eight months courtship, Margaret had become the Duchess of Kent. Sir Angus MacReady did not know whether the Duke had been aware then of the previous marriage, or, indeed, whether he had ever known.

Sir Andrew Campbell-MacDonald had also had his history investigated by Lord Camberton. There was certainly nothing shady in his past; he had had a good reputation in Scotland. In 1939, he had gone to New England and had served for a time in the Royal Legion. He had comported himself with honor in three battles against the red aborigines and had left the service with a captain's commission and an excellent record. In 1957, the small village in which he had been living was raided by the red barbarians and burnt to the ground after great carnage, and it had been believed for a time that Sir Andrew had been killed in the raid. He had returned

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to England in 1959, nearly penniless, his small fortune having vanished as a result of the destruction during the raid. He had been given a minor position and a pension by the Duke of Kent and had lived with his sister and brother-in-law for the past five years.

Lord Darcy put the letter aside and thoughtfully finished his caffe. He did not look at all as though he were about to have a rug-chewing fit of fury.

"The only thing missing is the magician," he said to himself. "Where is the magician in this? Or, rather, *who* is he? The only sorcerer in plain sight is Master Timothy Videau, and he does not apparently have any close connection with Lord Camberton or the Ducal Palace. Sir Thomas suspects that Sir Andrew might be a member of the Society of Albion, but that does not necessarily mean he knows anything about sorcery."

Furthermore, Lord Darcy was quite certain that Sir Andrew, if he was a member of the Inner Circle, would not draw attention to the Society in such a blatant manner.

"Here is your report, my lord," said Master Sean.

Lord Darcy came out of his reverie to see Master Sean standing by his side with a sheaf of papers in his hand. His lordship had been vaguely aware that the tubby little Irish sorcerer had been at work at the other end of the room, and now it was obvious what he had been doing. Except for a very slight dampness, there was no trace of the ink that had been spilled across the pages, although the clear, neat curves of Lord Darcy's handwriting remained without change. It was, Lord Darcy knew, simply a matter of differentiation by intention. The handwriting had been put there with intention, with purpose, while the spilled ink had got here by accident; thus it was possible for a removal spell to differentiate between them.

"Thank you, my good Sean. As usual, your work is both quick and accurate."

"It would've taken longer if you'd been using these new indelible inks," Master Sean said deprecatively.

"Indeed?" Lord Darcy said absently as he looked over the papers in his hand.

"Aye, my lord. There's a spell cast on the ink itself to make it indelible. That makes it fine for documents and bank drafts and such things as you don't want changed, but it makes it hard as the very Devil to get off after it's been spilled. Master Timothy was telling me that it took him a good two hours to get the stain out of the carpet in the Ducal study a couple of weeks ago."

"No doubt," said Lord Darcy, still looking at his report. Then, suddenly, he seemed to freeze for a second. After a moment, he turned his head slowly and looked up at Master Sean. "Did Master Timothy

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mention exactly what day that was?"

"Why . . . no, my lord, he didn't."

Lord Darcy put his report aside and rose from his chair. "Come along, Master Sean. We have some important questions to ask Master Timothy Videau—very important."

"About ink, my lord?" Master Sean asked, puzzled.

"About ink, yes. And about something so expensive that he has sold only one of them in Canterbury." He took his blue cloak from the closet and draped it around his shoulders. "Come along, Master Sean."

"So," said Lord Darcy some three-quarters of an hour later, as he and Master Sean strolled through the great gate in the outer curtain wall of Castle Canterbury, "we find that the work was done on the afternoon of May 11th. Now we need one or two more tiny bits of evidence, and the lacunae in my hypothesis will be filled."

They headed straight for Master Walter Gotobed's shop.

Master Walter, Journeyman Henry Lavender informed them, was not in at the moment. He and young Tom Wilderspin had taken the cart and mule to deliver a table to a gentleman in the city.

"That is perfectly all right, Goodman Henry," Lord Darcy said. "Perhaps you can help us. Do you have any zebrawood?"

"Zebrawood, my Lord? Why, I think we have a little. Don't get much call for it, my lord. It's very dear, my lord."

"Perhaps you would be so good as to find out how much you have on hand, Goodman Henry? I am particularly eager to know."

"O' course, my lord. Certainly." The journeyman joiner went back to the huge room at the rear of the shop.

As soon as he had disappeared from sight, Lord Darcy sprang to the rear door of the shop. It had a simple drop bar as a lock; there was no way to open it from the outside. Lord Darcy looked at the sawdust, shavings, and wood chips at his feet. His eye spied the one he wanted. He picked up the wood chip and then lifted the bar of the door and wedged the chip in so that it held the bar up above the two brackets that it fitted in when the door was locked. Then he took a long piece of string from his pocket and looped it over the wood chip. He opened the door and went outside, trailing the two ends of the string under the door. Then he closed the door.

Inside, Master Sean watched closely. The string, pulled by Lord Darcy from outside, tightened. Suddenly the bit of wood was jerked out from between the bar and the door. Now unsupported, the bar fell with a dull thump. The door was locked.

Quickly, Master Sean lifted the

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bar again, and Lord Darcy re-entered. Neither man said a word, but there was a smile of satisfacton on both their faces.

Journeyman Henry came in a few minutes later; evidently he had not heard the muffled sound of the door bar falling. "We ain't got very much zebrawood, my lord," he said dolefully. "Just scrap. Two three-foot lengths of six-by-three-eights. Leftovers from a job Master Walter done some years ago. We'd have to order it from London or Liverpool, my lord." He put the two boards on a nearby workbench. Even in their unfinished state, the alternate dark and light bands of the wood gave it distinction.

"Oh, there's quite enough there," Lord Darcy said. "What I had in mind was a tobacco humidor. Something functional—plain but elegant. No carving; I want the beauty of the wood to show."

Henry Lavender's eyes lit up. "Quite so, my lord! To be sure, my lord! What particular design did my lord have in mind?"

"I shall leave that up to you and Master Walter. It should be of about two pounds capacity."

After a few minutes, they agreed upon a price and a delivery date. Then: "Oh, by the by, Goodman Henry . . . I believe you had a slip of the memory when I questioned you last Tuesday."

"My lord?" Journeyman Henry looked startled, puzzled, and just a little bit frightened.

"You told me that you locked up tight on Saturday night at half past eight. You neglected to tell me that you were not alone. I put it to you that a gentleman came in just before you locked up. That he asked you for something which you fetched for him. That he went out the front door with you and stood nearby while you locked that door. Is that not so, my good Henry?"

"It's true as Gospel, my lord," said the joiner in awe. "How on Earth did you know that, my lord?"

"Because that is the only way it could have happened."

"That's just how it did happen, my lord. It were Lord Quentin, my lord. That is, the new Duke; he were Lord Quentin then. He asked me for a bit of teak to use as a paperweight. He knew we had a polished piece and he offered to buy it, so I sold it to him. But I never thought nothing wrong of it, my lord!"

"You did nothing wrong, my good Henry—except to forget to tell me that the incident had happened. It is of no consequence, but you should have mentioned it earlier."

"I humbly beg your pardon, my lord. But I don't think nothing of it."

"Of course not. But in future, if you should be asked questions by a King's Officer, be sure to remember details. Next time, it might be more important."

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"I'll remember, my lord."

"Very good. Good day to you, Goodman Henry. I shall look forward to seeing that humidor."

Outside the shop, the two men walked across the busy courtyard toward the great gate. Master Sean said: "What if he hadn't had any zebrawood, my lord? How would you have got him out of the shop?"

"I'd have asked for teak," Lord Darcy said dryly. "Now we must make a teleson call to Scotland. I think that within twenty-four hours I shall be able to make my final report."

There were six people in the room. Margaret, Dowager Duchess of Kent, looked pale and drawn but still regal, still mistress of her own drawing room. Quentin, heir to the Duchy of Kent, stood with somber face near the fireplace, his eyes hooded and watchful. Sir Andrew Campbell-MacDonald stood solemnly by the window, his hands in the pockets of his dress jacket, his legs braced a little apart. Lady Anne sat in a small, straightbacked chair near Sir Andrew. Lord Darcy and Master Sean faced them.

"Again I apologize to Your Graces for intruding upon your bereavement in this manner," Lord Darcy said, "but there is a little matter of the King's Business to be cleared up. A little matter of willful murder. On the 11th of May last, Lord Camberton returned secretly from Scotland after finding some very interesting information—information that, viewed in the proper light, could lend itself very easily to blackmail. Lord Camberton was murdered because of what he had discovered. His body was then hidden away until last Saturday night or early Sunday morning, at which time it was put in the coffin designed for His late Grace, the Duke.

"The information was more than scandalous; if used in the right way, it could be disastrous to the Ducal Family. If someone had offered proof that the first husband of Her Grace the Duchess was still living, she would no longer have any claim to her title, but would still be Margaret Lowell of Edinburgh—and her children would be illegitimate and therefore unable to claim any share in the estates or government of the Duchy of Kent."

As he spoke, the Dowager Duchess walked over to a nearby chair and quietly sat down. Her face remained impassive.

Lord Quentin did not move.

Lady Anne looked as though someone had slapped her in the face.

Sir Andrew merely shifted a little on his feet.

"Before we go any further, I should like you to meet a colleague of mine. Show him in, Master Sean."

The tubby little Irish sorcerer opened the door, and a sharp-faced, sandy-haired man stepped in.

"Ladies and gentleman," said

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Lord Darcy, "I should like you to meet Plainsclothes Master-at-Arms Alexander Glencannon."

Master Glencannon bowed to the silent four. "Your Graces. Lady Anne. An honor, I assure ye." Then he lifted his eyes and looked straight at Sir Andrew. "Good morrow to ye, Goodman Lowell."

The man who had called himself Sir Andrew merely smiled. "Good morrow, Glencannon. So I'm trapped, am I?"

"If ye wish to put it that way, Lowell."

"Oh, I think not." With a sudden move, Lowell, the erstwhile "Sir Andrew" was behind Lady Anne's chair. One hand, still in his jacket pocket, was thrust against the girl's side. "I would hesitate to attempt to shoot it out with two of His Majesty's Officers, but if there is any trouble about this, the girl dies. You can only hang me once, you know." His voice had the coolness of a man who was used to handling desperate situations.

"Lady Anne," said Lord Darcy in a quiet voice, "do exactly as he says. *Exactly,* do you understand? So must the rest of us." Irritated as he was with himself for not anticipating what Lowell would do, he still had to think and think fast. He was not even certain that Lowell had a gun in that pocket, but he had to assume that a gun was there. He dared not do otherwise.

"Thank you, my lord," Lowell said with a twisted smile. "I trust no one will be so foolish as not to take his lordship's advice."

"What next, then?" Lord Darcy asked.

"Lady Anne and I are leaving. We are walking out the door, across the courtyard, and out the gate. Don't any of you leave here for twenty-four hours. I should be safe by then. If I am, Lady Anne will be allowed to return—unharmed. If there is any hue and cry . . . well, well, there won't be, will there?" His twisted smile widened. "Now clear away from that door. Come, Anne—let's go on a nice trip with your dear uncle."

Lady Anne rose from her chair and went out the door of the room with Lowell, who never took his eyes off the others. He closed the door. "I shouldn't like to hear that door opened before I leave," his voice said from the other side. Then footsteps echoed away down the corridor.

There was another door to the room. Lord Darcy headed for it.

"No! Let him go!"

"He'll kill Anne, you fool!"

Lord Quentin and the Duchess both spoke at once.

Lord Darcy ignored them. "Master Sean! Master Alexander! See that these people are kept quiet and that they do not leave the room until I return!" And then he was out the door.

Lord Darcy knew all the ins and outs of Castle Canterbury. He had

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made a practice of studying the plans to every one of the great castles of the Empire. He ran down a corridor and then went up a stone stairway, taking the steps two at a time. Up and up he went, flight after flight of stairs, heading for the battlements atop the great stone edifice.

On the roof, he paused for breath. He looked out over the battlement wall. Sixty feet below, he saw Lowell and Lady Anne, walking across the courtyard—slowly, so as to attract no attention from the crowds of people. They were scarcely a quarter of the way across.

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Lord Darcy raced for the curtain wall.

Here, the wall was only six feet wide. He was protected from being seen from below by the crenelated walls on either side of the path atop the greater curtain wall. At a crouch, he ran for the tower that topped the great front gate. There was no one to stop him; no soldiers walked these battlements; the castle had not been attacked for centuries.

Inside the gate tower was the great portcullis, a vast mass of crossed iron bars that could be lowered rapidly in case of attack. It was locked into place now, besides being held up by the heavy counterweight in the deep well below the gate entrance.

Lord Darcy did not look over the wall to see where his quarry was now. He should be in front of them, and if he was, Lowell might—just might—glance up and see him. He couldn't take that chance.

He did not take the stairs. He went down the shaft that held the great chain that connected the portcullis to its counterweight, climbing down the chain hand over hand to the flagstones sixty feet beneath him.

There was no guardsman in the chamber below during the day, for which Lord Darcy was profoundly grateful. He had no time to answer questions or to try to keep an inquisitive soldier quiet.

There were several times when he feared that his life, not Lady Anne's, would be forfeit this day. The chain was kept well oiled and in readiness, even after centuries of peace, for such was the ancient law and custom. Even with his legs wrapped around the chain and his hands gripping tightly, he slipped several times, burning his palms and thighs and calves. The chain, with its huge, eight-inch links, was as rigid as an iron bar, held taut by the great pull of the massive counterweight below.

The chain disappeared through a foot-wide hole that led to the well beneath where the counterweight hung. Lord Darcy swung his feet wide and dropped lightly to the flagstoned floor.

Then, cautiously, he opened the heavy oak door just a crack.

Had Lowell and the girl already passed?

Of the two chains that held up the great portcullis, Lord Darcy had taken the one that would put him on the side of the gate to Lowell's left. The gun had been in Lowell's right hand, and—

They walked by the door, Lady Anne first, Lowell following slightly behind. Lord Darcy flung open the door and hurled himself across the intervening space.

His body slammed into Lowell's, hurling the man aside, pushing his gun off the girl's body, just before the gun went off with a roar.

The two men tumbled to the pavement and people scattered as

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they rolled over and over, fighting for possession of the firearm.

Guardsmen rushed out of their places, converging on the struggling figures.

They were too late. The gun went off a second time.

For a moment, both men lay still.

Then, slowly, Lord Darcy got to his feet, the gun in his hand.

Lowell was still conscious, but there was a widening stain of red on his left side. "I'll get you Darcy," he said in a hoarse whisper. "I'll get you if it's the last thing I do."

Lord Darcy ignored him and faced the guardsmen who had surrounded them. "I am Lord Darcy, Investigator on a Special Commission from His Majesty's Court of Chivalry," he told them. "This man is under arrest for willful murder. Take charge of him and get a Healer quickly."

The Dowager Duchess and Lord Quentin were still waiting when Lord Darcy brought Lady Anne back to the palace.

The girl rushed into the Duchess' arms. "Oh, Mama! Mama! Lord Darcy saved my life! He's wonderful! You should have seen him!"

The Duchess looked at Lord Darcy. "I am grateful to you, my lord. You have saved my daughter's life. But you have ruined it. Ruined us all.

"No, let me speak," she said as Lord Darcy started to say something. "It has come out, now. I may as well explain.

"Yes, I thought my first husband was dead. You can imagine how I felt when he showed up again five years ago. What could I do? I had no choice. He assumed the identity of my dead brother, Andrew. No one here had ever seen either of them, so that was easy. Not even my husband the Duke knew. I could not tell him.

"Chester did not ask much. He did not try to bleed me white as most blackmailers would have. He was content with the modest position and pension my husband granted him, and he behaved himself with decorum. He—" She stopped suddenly, looking at her son, who had become pale.

"I . . . I'm sorry, Quentin," she said softly. "Truly I am. I know how you feel, but—"

Lord Quentin cut his mother short. "Do you mean, Mother, that it was Uncle An . . . *that man* who was blackmailing you?"

"Why, yes."

"And Father didn't know? No one was blackmailing Father?"

"Of course not! How could they? Who—?"

"Perhaps," said Lord Darcy quietly, "you had best tell your mother what you thought had happened on the night of May 11th."

"I heard a quarrel," Lord Quentin said, apparently in a daze. "In Father's study. There was a scuffle, a fight. It was hard to hear through

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the door. I knocked, but everything had become quiet. I opened the door and went in. Father was lying on the floor, unconscious. Lord Camberton was on the floor nearby—dead—a letter opener from Father's desk in his heart."

"And you found a sheaf of papers disclosing the family skeleton in Lord Camberton's hand."

"Yes."

"Further, during the struggle, a bottle of indelible ink had fallen over, and Lord Camberton's body was splashed with it."

"Yes, yes. It was all over his face. But how did you know?"

"It is my business to know these things," Lord Darcy said. "Let me tell the rest of it. You assumed immediately that Lord Camberton had been attemping to blackmail your father on the strength of the evidence he had found."

"Yes. I heard the word 'blackmail' through the door."

"So you assumed that your father had attacked Lord Camberton with the letter opener and then, because of his frail health, fallen in a swoon to the floor. You knew that you had to do something to save the family honor and save your father from the silken noose.

"You had to get rid of the body. But where? Then you remembered the preservator you had bought."

Lord Quentin nodded. "Yes. Father gave me the money. It was to have been a present for Mother. She sometimes likes a snack during the day, and we thought it would be convenient if she could have a preservator full of food in her rooms instead of having to call to the kitchen every time."

"Quite so," said Lord Darcy. "So you put Lord Camberton's body in it. Master Timothy Videau has explained to me that the spell cast upon the wooden chest keeps a preservative spell on whatever is kept within, so long as the door is closed. Lord Camberton was supposed to be in Scotland, so no one would miss him. Your father never completely recovered his senses after that night, so he said nothing.

"Actually, he probably never knew. I feel he probably collapsed when Lord Camberton, who had been sent to Scotland by your father for that purpose, confirmed the terrible blackmail secret. Lowell was there in the room, having been taken in to confront the Duke. When His Grace collapsed, Lord Camberton's attention was diverted for a moment. Lowell grabbed the letter opener and stabbed him. He knew the Duke would say nothing, but Lord Camberton's oath as a King's officer would force him to arrest Lowell.

"Lowell, by the by, was a member of the Holy Society of Ancient Albion. Camberton had found that out, too. Lowell probably had lodgings somewhere in the city under another name, where he kept his paraphernalia. Camberton discov-

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ered it and brought along the green costume Lowell owned for proof. When Lowell talks, we will be able to find out where that secret lodging is.

"He left the room with the Duke and Lord Camberton still on the floor, taking the green robe with him. He may or may not have heard you knock, Lord Quentin. I doubt it, but it doesn't matter. How long did it take you to clean up the room, Your Grace?"

"I . . . I put Father to bed first. Then I cleaned the blood off the floor. I couldn't clean up the spilled ink, though. Then I took Lord Camberton to the cellar and put him in the preservator. We'd put it there to wait for Mother's birthday —which is next week. It was to be a surprise. It—" He stopped.

"How long were you actually in the room?" Lord Darcy repeated.

"Twenty minutes, perhaps."

"We don't know what Lowell was doing during those twenty minutes. He must have been surprised on returning to find the body gone and the room looking tidy."

"He was," said Lord Quentin. "I called Sir Bertram, our seneschal, and Father Joseph, the Healer, and we were all in Father's room when . . . *he* . . . came back. He looked surprised, all right. But I thought it was just shock at finding Father ill."

"Understandable," said Lord Darcy. "Meanwhile, you had to decide what to do with Lord Camberton's body. You couldn't leave it in that preservator forever."

"No. I thought I would get it outside, away from the castle. Let it be found a long ways away, so there would be no connection."

"But there was the matter of the blue inkstain," Lord Darcy said. "You couldn't remove it. You knew that you would have to get Master Timothy, the sorcerer, to remove the stain from the rug, but if the corpse were found later with a similar stain, Master Timothy might be suspicious. So you covered up. Literally. You painted the body with woad."

"Yes. I thought perhaps the blame would fall on the Society of Albion and divert attention from us."

"Indeed. And it very nearly succeeded. Between the use of the preservator and the use of woad, it looked very much like the work of a sorcerer.

"But then came last Monday. It is a holiday in Canterbury, to celebrate the saving of a Duke's life in the Sixteenth Century. A part of the celebration includes a ritual searching of the castle. Lord Camberton's body would be found."

"I hadn't been able to find a way of getting it out," Lord Quentin said. "I'm not used to that sort of thing. I was becoming nervous about it, but I couldn't get it out of the courtyard without being seen."

"But you had to hide it that day. So you made sure the shop of

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Master Walter was unlocked on Saturday night and you put the body in the coffin, thinking it would stay there until after the ceremony, after which you could put it back in the preservator.

"Unfortunately—in several senses of the word—your father passed away early Monday morning. The body of Lord Camberton was found."

"Exactly, my lord."

"Lowell must have nearly gone into panic himself when he heard that the body had been found covered with woad. He knew it connected him—especially if anyone knew he was a member of the Society. So, that afternoon, he burnt his green robe in a fireplace, thinking to destroy any evidence that he was linked with the Society. He was not thorough enough."

The Duchess spoke again. "Well, you have found your murderer, my lord. And you have found what my son has done to try to save the honor of our family. But it was all unsuccessful in the end. Chester Lowell, my first husband, still lives. My children are illegitimate and we are penniless."

Master-at-Arms Alexander Glencannon coughed slightly. "Beggin' your pardon, Your Grace, but I'm happy to say you're wrong. I've known those thievin' Lowells for years. 'Twas I who went to Zaragoza back in '42 to identity Chester Lowell. I saw him masael', and 'twas him, richt enow. The resemblance is close, but this one happen tae be his younger brother, Ian Lowell, released from prison in 1959. He was nae a card-sharp, like his brother Chester, but he's a bad 'un, a' the same."

The Dowager Duchess could only gape.

"It was not difficult to do, Your Grace," said Lord Darcy. "Chester had undoubtedly told Ian all about his marriage to you—perhaps even the more intimate details. You had only known Chester a matter of two months. The younger brother looked much like him. How could you have been expected to tell the difference after nearly a quarter of a century? Especially since you did not even know of the existence of the younger Ian."

"Is it true? Can it be true?"

"It is true, Your Grace, in every particular," Lord Darcy said. "You have reason to be thankful to Him. There was no need for Ian Lowell to bleed you white, as you put it. To have done so might have made you desperate—for all he knew, desperate enough to kill him. He might have avoided that by taking money and staying out of your reaoh, but that was not what he wanted.

"He didn't want money, Your Grace. He wanted protection, a hiding place in such plain sight that no one would think of looking for him there. He wanted a front. He wanted camouflage.

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"Actually, he is in a rather high position in the Holy Society of Ancient Albion—a rather lucrative position, since the leaders of the Society are not accountable to the membership for the way they spend the monies paid them by the members. In addition, I have reason to believe that he is in the pay of His Slavonic Majesty, Casimir of Poland—although, I suspect, under false pretenses, since he must know that it is not so easy to corrupt the beliefs of a religion as King Casimir seems to think it is. Nonetheless, Ian Lowell was not above taking Polish gold and sending highly colored reports back to His Slavonic Majesty.

"And who would suspect that Sir Andrew Campbell-MacDonald, a man whose record was that of an honorable soldier and an upright gentleman, of being a Polish spy and a leader of the subversive Holy Society of Albion?

"Someone finally did, of course. We may never know what led His late Grace and Lord Camberton to suspect him, although perhaps we can get Ian Lowell to tell us. But their suspicion has at last brought about Lowell's downfall, though it cost both of them their lives."

There was a knock at the door. Lord Darcy opened it. Standing there was a priest in Benedictine habit. "Yes, Reverend Father?" Lord Darcy said.

"I am Father Joseph. You are Lord Darcy?"

"Yes, I am, Reverend Father."

"I am the Healer the guardsmen called in to take care of your prisoner. I regret to say I could do nothing, my lord. He passed away a few minutes ago from a gunshot wound."

Lord Darcy turned and looked at the Ducal Family. It was all over. The scandal need never come out, now. Why should it, since it had never really existed?

Sir Thomas Leseaux would soon finish his work. The Society of Albion would be rendered impotent as soon as its leaders were rounded up and confronted with the King's High Justice. All would be well.

"I should like to speak to the bereaved family," said Father Joseph.

"Not just now, Reverend Father," said the Dowager Duchess in a clear voice. "I would like to make my confession to you in a few minutes. Would you wait outside, please?"

The priest sensed that there was something odd in the air. "Certainly, my daughter. I will be waiting." He closed the door.

The Duchess, Lord Darcy knew, would tell all, but it would be safe under the seal of the confessional.

It was Lord Quentin who summed up their feelings.

"This," he said coldly, "will be a funeral I will really enjoy. We thank you, my lord."

"The pleasure was mine, Your Grace. Come, Master Sean; we have a Channel crossing awaiting us." ■

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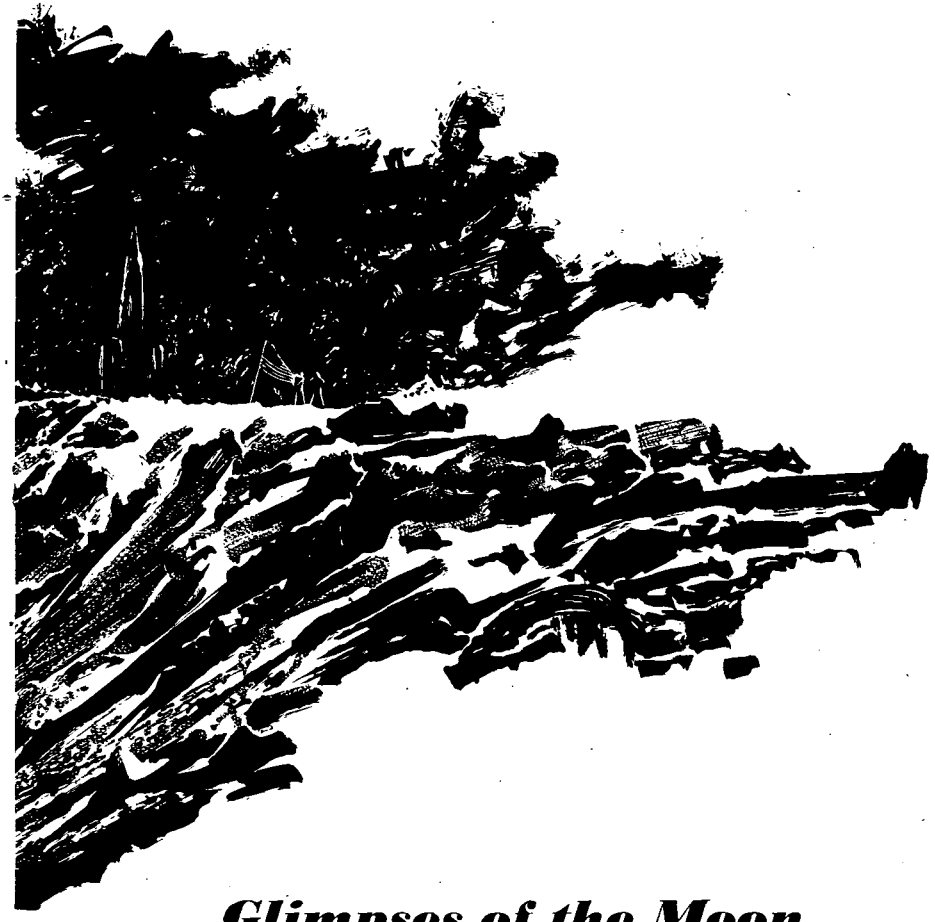

Glimpses of the Moon

In all history, I know of only one true, three-cornered war. This might have made a second . . . except for a fourth party . . .

WALLACE WEST

Illustrated by John Schoenherr

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Someday . . . we are going to see something not to our liking,
some looming shape outside there
across the great pond of space

LOREN EISELEY
"The Immense Journey"

Butter-yellow morning sunshine caressed porticoes of The Hague's stately Peace Palace. It splashed like a blessing across the wide square and through windows of the Officers' Club. It highlighted the weary faces of diplomats, lawyers, correspondents and other club members while dimming a still photograph of the moon on a TV set in the lounge.

". . . And yet, my friends," a fruity baritone voice was soaring from the set's loud-speaker, "my words cannot hope to convey the majesty—the grandeur—of the scene before me. I stand, proud and lonely, upon a silent peak of Copernicus. Before me, a sun-drenched crater stretches to glimmering distances. Behind me towers my ship, where my valiant crew awaits my order to debark. Above me, the cloud-swathed earth turns visibly as Alaska sinks beyond my sight . . ."

"Oh me, oh my!" snorted Gerald Fortesque, United Press International correspondent, as he sipped a Gibson. "Eleven first-person singular pronouns in thirty seconds. That must be a record. No mistake, folks. Horrible Horace is there."

"Shhh!" came annoyed whispers from the listeners.

"I feel I must express my humility and my solemn joy," the voice chanted. "Words fail me . . ."

"For the first time, I'll bet," Fortesque interjected.

"Shut your big mouth, Gerry!" someone yelled.

"I can only quote those exquisite lines by Keats:

" 'My spirit is too weak—mortality
Weighs heavily on me like unwilling sleep
And each imagin'd pinnacle and steep
Of godlike hardship, tells me I must die
Like a sick Eagle looking at the sky.' "

Static sputtered warningly.

"And now I fulfill my lifelong dream. In the presence of my Almighty God, and through power invested in me, Air Force First Lieutenant Horace Brown, by my President, I plant the Stars and Stripes forever on Copernicus and take possession of the moon for the United States of America. I . . ."

The static rose to a crescendo.

"Sick Eagle timed it perfectly," Fortesque said to an old man seated beside him as the moon photo on the TV tube was replaced by a well-known face that made joyful sounds with a southern accent. "One minute earlier with that grandstand play and the President would have had a chance to cut Horrie down to size. But he finished just as the short-wave station at Unimak lost contact. Our phony Cortez will go far, won't he, Your Honor?"

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"Farther than the White House, perhaps," Judge George Gavin, U. S. representative on the International Court of Justice, agreed. He drained an *Old Crow* and branch water, wiped moisture from his white mustache and goatee, and added: "Unless the Russians put a flea in his jets."

"How can they that do?" someone asked. "Americans first to the moon have got."

"Space law is peculiar, Herr Gottlieb," Gavin replied. "Let us tune in Moscow."

That channel was off the air. A test pattern announced in several languages that "A direct telecast from the moon will be presented shortly through the Vladivostok relay."

"Live?" Fortesque perked up. "Oh no! They couldn't have carried TV equipment. It's too heavy."

"Our ship is larger than yours." Judge Prybylowski, Polish member of the court, was trying to salve his slavic pride.

"And slow!" said a voice with a burr in it. " 'Tis the Yanks who've won. I owe Judge Gavin ten pounds. A pity Her Majesty's ship developed fuel trouble at the start of the race."

"Keep your money for a time, MacGregor," said the jurist.

"What do you mean, sir?" Fortesque scented a story.

The test pattern dissolved to show the square head of a commentator.

"We take you now to Copernicus," he said in Russian and repeated in English, French, Spanish, Italian and Arabic.

The TV screen focused on a full moon and zoomed toward it. Watchers in the dimly-lighted lounge gripped the arms of their chairs. The scene expanded while a roar of jets faded into sleepy murmurings.

"Wunderbar!" Gottlieb said grudgingly. "Those *verdammten* Russians no precision equipment and no technologists have got. Yet they this can do!"

Copernicus wheeled into line and grew like a fang-studded maw.

"How are they managing this, Harry?" Fortesque asked as he signaled the sleepy steward for another drink.

"They've picked up a running telecast from the ship, taped it, and cut it," NBC's string man answered from the back of the room. "Sweet job, though I hate to admit it."

The crater rim lunged at them.

"We're going to crash!" someone yelled, then joined sheepishly in the laughter.

The camera dollied back as retro-rockets blazed outside a port. The ship jarred to a landing. Clouds of pumice billowed and flopped to the moon's surface like powdered lead.

The camera nonchalantly studied the needle-nosed American ship poised three miles away, then surveyed the interior of the Soviet craft. Its visible crew members—

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two young men and an intently pretty blonde—gave a last check to their instruments, stood up awkwardly, kissed one another on both cheeks, and babbled as they suited up.

"That Captain Ivanovna!" Gerry sighed as he lifted his glass. "For just one smile I might defect."

"Schweinehund!" Herr Gottlieb muttered.

Fortesque ignored that insult as he watched the explorers uncase a crimson banner, unscrew a port and clamber gingerly to luna firma. They tried to march smartly to the crater edge, bounced in the low gravity, but got there somehow. Wedging the base of a pole into a crevice, they levered the flag into position.

"Those stinkers!" Harry erupted. "They're plagiarizing the flag-raising we staged at Iwo Jima. This scene will knock the unfree world on its fanny. Whoever's handling that camera is a cockeyed genius."

Captain Ivanovna saluted the limp emblem and faced them. The ship provided perfect background. Rays from a setting sun highlighted her snubnosed face. Her full lips moved.

A few seconds later her husky contralto came through, first in Russian and then in English.

"The crew of *Vostok X* hereby takes possession of the moon for the Union of Soviet Socialist Republics."

The screen flashed fireworks as Russia's anthem blared.

"Damned clever ploy!" Judge Gavin finished his fifth O.C. & b. w. "Russians learn fasht".

"Judge!" Gerry gripped his arm. "Let's get out of here before Harry or the other newshawks catch on. I want an exclusive."

As they ordered breakfast at one of The Hague's few good restaurants, Gavin surveyed his friend.

"Before we start this interview," he said, enunciating with great care, "tell me what you have against Lieutenant Brown."

"Oh, he's the goof who tries to operate automatic elevators," Gerry hedged. "You know: pushes the 'Door Close' and 'Door Open' buttons. Makes like an operator."

"Come now, boy!"

"He once ruined my only good suit, sir. That was late in '66, when I was UPI Bureau Manager at Indianapolis. Earlier that year a British ship had crashed after circumnavigating the moon. When Horrie repeated the stunt and brought his rocket back for a safe landing he became an international hero. He was asked to fly his own plane on a whirlwind world tour.

"In those days he hadn't learned to treat reporters like pals. He despised them. When he landed at the Indianapolis airport on a rainy day and saw a crowd of us waiting to interview him he pushed the rudder over, gunned his jets and sprayed us with water and oil as he taxied down the field. Stinker!"

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"A childish grudge," Gavin chuckled.

"Maybe. But a new suit cost me two weeks' pay."

"How about a spot of *kirschwasser* to smooth your ruffled feathers?

"You know you can't quote me, Gerry," he continued after a startled waiter had served the untimely *aperitif*. "Judges must appear impartial."

"Just tell me what's going on. I'll find some American big shot who likes to get his name in print and quote him as competent authority. Ivanovna must have monitored Brown's broadcast. From where I sit, it looks as if she made a fool of herself and her government. What gives?"

While the hovering waiter shuddered, Gavin drew two circles, one large and one small, on the tablecloth.

"Earth here. Moon there," he said as he sipped. "The United States, from Maine to Alaska, covers some one hundred five degrees of longitude. Right?"

"Yeah . . . I guess so."

"And, according to international law and custom, any nation owns everything that lies under or over it 'from the center of the earth to the heavens above.' "

"Now wait a minute, Judge. No nation ever claimed that it owned a man-made satellite that passed over it."

"Quite true, my boy, and for good reason . . . Waiter, two more *kirschwassers* . . . Any such claim would have been a legal fiction. It couldn't be enforced, so the law can take no cognizance of it.

"But the moon is not a man-made satellite. Look here." He drew two diverging lines from the center of longitude covered by the Soviet Uncumference so they passed on either side of the small circle. "Let's say those lines pass through the eastern tip of Maine and the western tip of Alaska. While the moon is above its horizon, therefore, the United States can claim ownership by right of discovery."

"But while the moon is above the one hundred eighty degrees or so of his big circle and through its cirion *it* has the right to claim ownership!" Gerry's jaw dropped.

"Correct. And claim to prior discovery has nothing to do with the case."

"But that's impossible, sir. Surely, international lawyers have seen this coming and worked out some solution."

"Oh, we've tried. We've tried." Gavin lit a long pale cigar. "A committee on space law has been holding meetings regularly over the past ten years to consider the matter but it has never reached agreement."

"Does the U. N. know about this legal tangle?"

"The Court so advised it. That was one reason why the United States and the Soviet Union reached a tentative agreement, back in

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1963, that celestial bodies were not to be subject to national appropriation 'by claims of sovereignty, by means of use or occupation, or by any other means'. That also was one reason why President Kennedy proposed his joint moon venture.

"But that agreement was sabotaged in the U. N. General Assembly. Why? Because the boys who run the space shows for Moscow, Washington and London were all overconfident. Their intelligence services told each of them that the others were 'way behind schedule. The joint venture was sidetracked and this silly race was cooked up instead. Each group of 'experts' knew its ship was bound to win. The others wouldn't get off the ground."

"Like an amateur poker player trying to draw two cards to fill a straight," Gerry grinned. "But only one card dropped when the British ship conked out. So why, when a dead heat developed, didn't we split the pot with the Russians?" He stopped, fork halfway to mouth. "Why, that . . ."

"Exactly." The jurist sipped black coffee. "Brown won by a nose and grasped a golden opportunity to play Cortez."

"What a crazy grandstand play. Why didn't the President countermand it?"

"He would have, I'm sure, except for the fact that Brown staged his coup just before radio contact was lost. Then it was too late. The flag-raising became a *fait accompli*. The President couldn't slap down a hero who couldn't talk back. He would have wrecked the Democratic party and ruined its chance of winning the 1968 election. Be your age, son."

"You mean our twerp on the moon has set American policy?"

"He has set world policy. Ivanovna took the only possible counter-action. A fast thinker, that girl. Brown must be raving."

"This can mean a revival of the cold war, or even the start of a hot one," Gerry groaned. "Surely something can be done."

"What would you do if you were in Brown's boots?"

"Me?" The reporter's eyes grew dreamy. "I'd go over to the red ship and try making violent love to Ivanovna, bless her pretty nose. Afterward, we might sign a *detente*. But Horrie is the, uh, perennial bachelor type. He'll shoot it out instead."

"I don't think so. He can't attack the Russians during the hours that they own the moon. That would be piracy, according to international law, and unthinkable with all the world watching. And they can't attack him while *he* owns the moon. Impasse!"

"You're wrong, sir. There are four hours or so every day when the moon is over the Atlantic Ocean or western Europe and nobody owns it. What happens then?"

"A moot question. A very moot

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question." Gavin pulled at an ear in deep thought. "We're playing an interstellar game of ticktacktoe. A great pity that the British are out of it."

"The Russians must be building their base right now," Gerry exclaimed. "Let's say they set up several pressurized huts before moonset over East Germany. Then, when the moon rises over Maine, Horrie and his crew will march over and tear down those huts. According to your advisement, the Russians will have no cause to object."

"Correct. You've missed your calling, son."

"But later, when the moon goes down over Alaska, the Russians march over to the U. S. camp that Brown will have started and . . . Glory! What a mess!"

"That's why I told Ambassador MacGregor to keep his money. Neither of our sandcastle builders can set up a permanent base under international law as it stands today. They can only keep interfering with each other until their supplies run out and they have to hit for home. After that, when both sides bring their squabble before the Court, we judges will have to say, with Alexander Pope:

" 'Luxurious lobster nights, farewell,
For sober, studious days.'

"At least the ruckus should be more edifying than the one which took place in 1962 when we slapped Russia on the wrist for not paying her United Nations assessments."

"Look, sir." Fortesque gulped coffee and stood up. "I've got to find someone who'll let me quote him, and get this story on the wires. What say we meet at the club at noon and see how much hell has broken loose?"

"I'm seventy-five and need my sleep," Gavin replied as he removed the tip of a napkin from his wing collar. "Also, I must sober up if I am to retain my high moral rating. We'll meet *here* at this time tomorrow. I'll be cantankerous as all hell by then, I warn you."

"You can poke me in the eye, if you wish, in return for this scoop," Gerry grinned at him fondly before hurrying out into the Plein.

"You're late," the judge roared when Fortesque entered the crowded restaurant promptly at 8:00 a.m.

"Sorry, sir. I've been on the jump since I left you. The New York UPI office has . . ."

"Stop jumping and sit down. That witch of an Ivanovna has pulled another fast one. Listen to her!" Gavin pointed his shaking finger at a TV set in one corner of the room.

. . . . "Fully aware that the American imperialists would destroy any structures that we might build," the girl was saying as she sat, relaxed and smiling, at the Soviet vehicle's control panel, "we voted not to attempt any construction. Instead, we spent the time when we

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were in uncontested possession of the moon on exploration. We are proud to report to the Fatherland that the moon has a very tenuous atmosphere but one that can be compressed sufficiently to support human life. A plentiful supply of water can be extracted from the rock strata. The coating of pumice, while treacherous in spots, is not impassable. When the moon is internationalized it can be turned into a green world."

"Churchill was right." Gavin licked parched lips. " 'Russia is a riddle wrapped in a mystery inside an enigma.' I need a drink!"

"May I order you one, sir?"

"Don't be an idiot. I'm on the wagon until this is over."

"We shall continue our explorations and report our findings each day to the United Nations and the world television audience," Ivanovna went on, first in Russian and then in a clipped British accent. (Was Moscow transmitting a simultaneous translation? Gerry wondered. No, the lip movements were perfectly synchronized. The girl knew English.) "Naturally," she continued serenely, "we shall use our daily period of moon ownership to block any American attempt to construct a base here in flagrant defiance of international law. *Daspedanya.*"

"Where does it leave Horrie?" Gerry breathed as Ivanovna's image faded, strains of the "Internationale" flooded the restaurant.

"Up the well-known creek," Gavin snorted. "What can he do but out-explore her? She has scooped him, as you would say."

"Don't underrate our champ," said the newshawk. "Wait till he comes on the air."

"Maybe you have something there," said the judge. "I'm about to jump out of my skin, as I always am when I go off the booze. Let's take a long walk. Help me up, confound you. My legs are shaky."

Hand on his friend's arm, Gavin tottered out into the Plein, which is The Hague's central square. As he gradually got himself under control, he gave a running commentary on the history of the little city.

"It's poetic justice," he said after a time, "that the Czar of all the Russias put this place on the map by calling the first peace conference here in 1899. That conference was to usher in the millennium. It didn't.

"There was another peace conference in 1907, but it wasn't until 1922 that the Czar's dream, a Permanent Court of International Justice, held its first session. That court died an ignoble death in 1945, along with the League of Nations.

"There's the Permanent Court's mausoleum—the Temple of Peace built by Andrew Carnegie with money he sweated out of his munitions workers. As added tourist attractions, The Hague boasts a cannon factory and a statue of Spinoza, its God-intoxicated philosopher

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who discovered that man is an animal, albeit a social one."

"The Permanent Court must have done some good." Gerry was horrified.

"Oh yes. It postponed the start of World War II by at least three months." Gavin leaned heavily on his arm. "The International Court of Justice, an adjunct of the United Nations, held its first meeting in 1946 in Carnegie's marble monstrosity. Its most notable achievement to date has been a seven-to-five decision that 'Thailand is obligated to withdraw its police forces from the area of the Temple of Preah Vihear and to return to Cambodia any sculptures, fragments and ancient pottery that may have been removed from the temple since 1954.'"

"Don't be cynical, sir."

"Who's being cynical? *'Sans vino veritas'* or whatever the cursed Latin phrase is. That was an excellent decision. Unfortunately, Cambodia accepted the jurisdiction of the Court as compulsory but Thailand claimed lack of jurisdiction . . . Let's take a taxi to the Officers' Club, son. I'm *ausgespielt,* as Herr Gottlieb would say."

Western European channels were boiling with speculation when they reached the lounge but only test patterns showed from Moscow or the Syncom relay to Washington. Habitues drifted in and out, fidgeted, argued, made bets, filled the place with smoke and snatched late editions as they were delivered.

Gavin snarled at his friends and sulked in a corner while consuming endless cups of black coffee. Gerry exchanged chatter with the AP, Reuters and other correspondents.

MacGregor created a flurry when he appeared at 2:00 p.m.

"Just got word from Whitehall," the ambassador announced. "Our ship is being repaired. Colonel Kane says he will take her up again in a few days."

"Ach! Gutt!" said Gottlieb over a seidel of Pilsner. "Although Colonel Kane as the pilot I do not approve, *verstiehen Sie?* The man *ein* Amerikaner ist, and a Jonah also."

"Kane was first around the moon, even though he did crash after reentry," the Scot answered coldly. "He's entitled to another chance, just as is your nation, Herr Gottlieb."

"Hah!" The German turned his fat back and fiddled with TV controls. As he did so the Syncom pattern was replaced by an announcer who said:

"We now present the President of the United States."

He spoke first of the American crew; of its daring and unselfish heroism. He saluted the almost equal achievement of the Russians, duly noted their claim to possession and promised that it would be adjudicated by the International Court. Then he thanked Captain Ivanovna personally for not at-

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tempting construction of a permanent base and paused, passing a weary hand across his forehead.

"I well realize," he continued at last, "that in all parts of the world, billions of viewers are tensely awaiting another direct report from Lieutenant Horace Brown. I deeply regret that I must disappoint you. Such a report cannot be made."

There was uproar in the lounge until Gavin enjoined silence by beating his coffee cup on a table top.

". . . Can only tell you," the President's voice finally could be heard saying, "that, since the United States claims sole ownership of the moon by right of prior discovery, its government has decided that, for top security reasons, no further broadcasts can be permitted. I can also tell you that the American expedition continues to function normally and that it hopes to return to earth on schedule.

"I deeply regret this need for secrecy, yet I see no other course open, at least until representatives of my government have had time to consult with the United Nations Secretariat. I have just been on the hot wire to the Kremlin urging the Soviet Union to join in maintaining silence.

"I well know that the concept of trust among nations is laughed at in many circles. Yet I ask you all to trust me and my government in this emergency and to believe that we are working for the best interests of the entire human race."

The screen went blank to the strains of the President's favorite "America the Beautiful."

The wire service correspondents and other reporters threw a cordon around Gavin, MacGregor and Prybylowski.

"How do you interpret that statement?" they implored.

"I cannot be quoted," Gavin replied firmly "and"—with a warning glance at the Pole—"neither can any of my associates."

"Off the record, then, please," begged the Reuters man.

"Not even off the record."

"Ambassador! Ambassador!" shouted Harry as he thrust a tape recorder forward. "Surely you can make a statement for the world's largest network."

MacGregor shook his head and pushed his way through the ring of perspiring interviewers.

"I no official capacity have," Herr Gottlieb suddenly boomed. "I only a great physicist am who at Peenemunde with Oberth worked. Aber I know the President's statement only one of two meanings can have. How much for an exclusive statement am I offered?" He smoothed his crewcut as he took his place in the sun.

The AP bid high, after hasty consultation with Harry. They dragged the German into another room while frustrated Reuters collared Judge Prybylowski in the hope of

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breaking him down. As the lounge emptied, Gerry ordered another round of coffee for himself and Gavin.

"Give!" he commanded. "Or must I go to the embassy?"

"My boy," said the judge with a flicker of his old smile, "no American official will dare open his big mouth today. You will find no reputable person at The Hague foolish enough to be your 'competent authority'.

"I know you have to file some story or get fired. Why not write a 'think piece' that may undercut Gottlieb's AP-NBC exclusive? Start with 'Usually unimpeachable sources who can't be quoted say . . .'

"Well . . ." Gerry chewed a pencil stub. "I could report a rumor that Horrie stumbled on a flying saucer."

"Not bad. The tabloids will lap it up. But you'll need an alternative explanation to euchre Gottlieb."

"How's this: Brown is waiting the Russians out. He's put himself and crew on starvation rations. After Ivanovna pulls her freight when her food, water and air run out he will hang on and build his base after all."

"Ivanovna will catch on to that dodge."

"Sure. But she'll crack first. Women are weaker than men."

"Evidently you haven't seen Russian amazons working on the railroad."

"There's still another angle, judge. Why is this Gottlieb person hanging around The Hague?"

"He wears a black homburg. Obviously he's a TV villain."

"I'm serious. Gottlieb has awfully long ears. He knows rockets. He was furious that Colonel Kane is not being replaced as pilot of the British ship.

"Not many people remember that Jonah story about Kane. I do because I interviewed the colonel and his half-cracked millionaire backer when I was stationed in the Near East. That was in '66, just after the old *Moonraker* crashed into the Mediterranean. I may be wrong, but I have a hunch . . ."

"Go on, son." Gavin was shakily intent.

"I can't put my finger on it . . ." Gerry bit a knuckle. "At first, Britain refused to enter a three-cornered space race. Said she couldn't afford to spend the money needed to build a ship. Then, somehow, the ship was built. Subscriptions? I should remember—"

" 'Unusually reliable sources' said construction was financed through a joint venture of British and German capital," Gavin hinted.

"Crickets! Private money mixed up in this mess?" Fortesque almost knocked over the table as he jumped up. "Talk about a 'think piece'! This may be hot. I've got some digging to do."

"Don't work too long," said the judge. "I'm taking you out to Schevenigen for our last lobster

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night in several months. Seaside place I know there has excellent wines. I'll enjoy watching you drink them for me. Here. Help me up!"

Gerry's think-piece kept him off the unemployment rolls, but his efforts to pin down backers of the earthbound British expedition were a flop. He did learn that construction of the ship had been privately financed, as Gavin suspected. Rumor said the sponsors were several big German Atkiengesellschaften in addition to Frederick Reynolds, the eccentric Folkstone steel magnate who had backed Colonel Kane's disastrous *Moonraker* flight. Nobody he interviewed would guess who was in control.

"Suggest trip London-Berlinward to check British moonship owners," he cabled New York hopefully.

"No Kaneraising," came the tart reply. "Onkeep shirt."

For a week, things were dull around the Officers' Club. Speculation about the meaning of the communications blackout died down. Talk turned to another colonels' coup in Bolivia, saber-rattling on the Pakistani border and new reports of famine in China.

The moon snapped back into focus after brief announcements from Washington, Moscow and London. The American and Russian expeditions were on their way home—and Britain's entry was climbing the sky.

"Judge Gavin! Judge Gavin!" clamored correspondents in the lounge. "What do you make of this?"

"Check with Herr Gottlieb," he snarled, sober and mean as a rattlesnake. "Mac," he added, "looks as if you may win that bet after all."

"Let's wait for your court session before we settle," said the ambassador. "When will it convene?"

"The day after all three ships get home, I suspect," the judge replied.

"Television," said Reuters, "is the curse of jurisprudence and journalism."

"Check!" said AP as he watched network technicians and press photographers scurry about the oak-paneled International Courtroom adjusting lights, measuring distances and taking endless shots of Captain Ivanovna and occasional ones of radiation-scarred Colonel Kane and surly Lieutenant Brown.

"It's certainly putting Horrie's nose out of joint," Gerry grinned. "Miss Red Universe is getting all the footage."

"He'll be back in the limelight shortly," said a tweedy individual from the London *Times*. "Brown's the man to watch."

The Clerk of Court rang his little bell and asked that everyone rise.

Members of the court filed in self-consciously. They wore identical black robes and white stocks. Otherwise, they were a cross-section of the human race—big men

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and little men; fat men and skinny men; white, black and yellow men —representing fifteen nations in all corners of the world.

The justices seated themselves behind a table which occupied one end of the room. Correspondents crowded another table to the right. The three witnesses joined their respective ambassadors and advisors at the left. Photographers and TV men still jittered. Barristers in tightly-curled wigs occupied a row of chairs behind the empty lectern facing the court.

"Why the Greek chorus?" Gerry whispered.

"Window dressing?" hazarded a wizened character from the *Herald-Tribune's* Paris office.

"No court is complete without barristers," Reuters frowned them down.

When the silence became total, Chief Justice Gavin cleared his throat, removed his pince-nez and let bleak gray eyes roam the court.

"You may be wondering why no spectators are present," he said at last. "The reason is that the unparalleled gravity of the case before us today requires that no report of this session reach the outside world unless authorized by me."

"Oh, I say, Your Honor!" As senior correspondent at The Hague, Reuters bespoke the astonishment and protest of the other journalists.

"Don't interrupt!" Gavin rapped for order. "I repeat: If no statement is authorized by this court, and any person in this room breaks secrecy, he shall be declared a traitor to his government and be summarily shot. I say this under instructions from the United Nations Secretariat. Anyone not wishing to conform to this ruling shall leave the presence of this court AT ONCE!"

"But what about television?" Reuters protested.

"Everything is being taped and will be censored. Now, does anyone wish to leave the room?"

Nobody moved.

"On this day of September 28, 1968," Gavin went on "this International Court of Justice has been convened in emergency session to consider and advise upon three disparate claims to exclusive or part ownership of the moon.

"Why anyone should want that dead hunk of stone the court cannot conceive. Nevertheless, it must recognize that each of the claims is based upon a valid point of international law. Let me endeavor to explain the situation briefly:

"Discussion of the upper limit of state sovereignty has increased in recent years with the developing potentialities of outer space satellites. The effort to define this limit as the limit of air space where aircraft can travel—as the limit of control of hostile air or spacecraft from the ground—or as the limit required for security of the subjacent state—have all been proposed

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by committees of this court, and have been successively rejected by the sovereign states.

"Jurists of said states hold that none of these definitions would, at the same time, assure protection of the state from espionage or attack and the free travel of their satellites in outer space.

"Discussion has tended to the view that the limit of *sovereign* space cannot be determined until there is agreement on the status of *outer* space. Yet today, when there seems to be no general agreement except that space vehicles are under the sovereignty of the launching states, we are presented with claims to ownership of the moon by expeditions financed by the United States of America, the Union of Soviet Socialist Republics and by a private venture duly chartered by the government of Great Britain.

"Obviously, this alone makes for an explosive international situation, one which may conceivably lead to space warfare. In addition, the court is informed that another factor, of which it is not yet fully cognizant, now complicates the argument.

"This court has been called into emergency session to adjudicate these issues and, if possible, to suggest a solution. I hope you will bear with us in our efforts. Have I made myself clear? I have. Therefore the court shall call its first witness. Captain Valentina Ivanovna, please take the witness stand."

The blond girl—she was in her late twenties but looked younger—stepped to the lectern and waited tensely.

"Captain Ivanovna, have you been empowered to express not only your own views but those of your government?"

"For the record, Your Honor," the clerk interrupted, "what government do you refer to?"

"To the government of the Union of Soviet Socialist Republics, of course," Gavin snapped. "Answer the question, captain."

"I have been so empowered with, of course, the assistance of the Soviet ambassador to The Hague."

"Tell us just what you found on the moon."

"Your Honor," she said in careful English, "my crew and I, by our own efforts, found little more than I reported in my only telecast after our landing. A recording of that statement is available for the record, but I shall repeat the gist of it: We found the region of Copernicus crater to be a desolate waste. Our brief exploration disclosed the presence of a tenuous lunar atmosphere and considerable water of crystallization in underlying rock formations.

"For reasons of which you are aware, and also because temperatures are impossibly high in the Copernicus area, we decided not to attempt to build a permanent base there."

"In your opinion, captain," Judge

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Born of Great Britain cut in, "would it be possible to develop a base in the more temperate regions near the lunar poles?"

"It would be possible but not pleasant."

When the laughter died, Judge Prybylowski asked:

"Does your government claim complete or joint ownership of the moon?"

"I cannot . . ." she hesitated.

"If the court please!" boomed a voice from the left hand table.

"Yes, Ambassador Chernov?" Gavin asked.

"I am authorized by my government to state that it has, as of today, withdrawn all claims to ownership of the moon."

Pandemonium erupted and Gerry started a mad race with his colleagues for the nearest telephone. Uniformed guards barred their way to the exits and they returned sheepishly to their seats.

"Why, my dear captain," the Chief Justice asked as soon as he could be heard, "did you agree with Lieutenant Horace Brown to cease telecasting?"

"I would prefer to let Lieutenant Brown explain that," Ivanovna replied with a tight-lipped smile.

"Extraordinary!" Gavin regarded her pert face with approval. "And I had expected you and Tovarich Chernov to wave red flags. Perhaps there is a way out of this. Step down, now child. Colonel Wellington Kane, please take the stand."

The first circumnavigator of Luna limped to the lectern, removed dark glasses and squinted at the justices. Plastic surgery had made his face passably human, but he was obviously in pain.

"For the record, colonel," Gavin said with a side glance at his nervous clerk, "will you identify yourself and your employers?"

"I am an American citizen," Kane replied. "At present I am employed by the Lunar Corporation, a private joint venture chartered by the government of Great Britain."

"Please name the principal financial backers of your expedition."

"They have forbidden me to reveal their identity, Your Honor. Their legal position is that this court has no jurisdiction over the affairs of private citizens. They cite, among other cases in point, this court's ruling in . . ."

"Never mind citations now," Judge Born interrupted. "Is Frederick Reynolds one of your backers?"

"I cannot answer that." Kane looked uncomfortable. At the advisors' table, Herr Gottlieb smirked and smoothed his brush of hair.

"Will you deny that Berlinische Metalwerke, A. G., is your principal backer?" Prybylowski shouted, his beard bristling with hatred for all things German.

"I neither deny nor affirm. I stand mute."

"I can hold you in contempt, sir," Gavin warned.

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"Even in that case, Your Honor, I am not authorized to answer."

"Hm-m-m." Gavin pulled at a bushy white eyebrown. "Let us drop this line of questioning for a moment. On your trip around the moon in 1966, or during your recent landing there, did you notice any unusual feature that might have required the imposition of radio and TV silence?"

"I did not. During most of my first trip my crew and I were partially or wholly unconscious because of a radiation dose received through the ports of our ship. This time none of us observed anything unusual."

"Tell us what you did see and do there."

"We came in on a polar orbit and circled the moon twice while braking to a landing. While passing over Copernicus we made sure that the Russians and Americans had departed without making attempts to build permanent camps.

"We landed near the Lunar North Pole. There, as Captain Ivanovna has surmised, temperature and other conditions are more equable than near the equator.

"We spent ten days compressing a small portion of the lunar atmosphere, mining water from the rocks, setting up a permanent camp and stocking it with enough frozen food to permit one of our number to remain in residence until our next trip, which is planned for October of this year.

"Then, just before blastoff for earth, at 23:05 solar time, August 27, 1968, I planted a British flag and claimed sole ownership of the entire moon by right of prior development."

"Your Honor! Please, Your Honor!" Reuters, minus all *sang-froid,* was on his feet. "You must . . . you simply can't refuse to permit me to phone this story to my office. England expects . . ."

"England expects every man here to shut up and sit down!" Gavin roared. When the journalist collapsed he continued:

"Colonel Kane, what plans do your German and English backers have for developing the moon as a military base?"

"I did not mention the nationality of my backers, Your Honor. Neither did I say anything about a military base . . . only a permanent camp."

"That will be all for the present, colonel." Gavin did not seem annoyed because his leading question had been evaded. "Lieutenant Horace Brown, please take the stand."

As the tall shock-haired officer stepped into the limelight, Gerry wondered once more why he disliked him so. Brown was handsome in an unfinished sort of way. He was competent; no doubt about that. Perhaps it was because he was so certain of himself; so confident that the rest of the world was wrong.

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"I am First Lieutenant Horace Brown of the United States Air Force, temporarily on assignment to the National Aeronautics and Space Administration," the witness volunteered.

"The court has been given to understand that you made some discovery of epoch-making importance while on the moon," said the Chief Justice. "Will you please tell us about it if you are authorized to do so?"

"I am so authorized by the President of the United States." Brown stuck out his bemedaled chest and saluted smartly for the benefit of the cameras and TV recorders. "I found there a beacon which was radiating signals of some sort into space."

"Order! Order!" Gavin yelled as the courtroom exploded.

"A beacon?" he demanded when partial quiet had been restored. "What on earth . . . ?"

"On Luna, Your Honor," Brown corrected insolently. "This happened after the unfortunate intrusion of Russia's ship made construction of a base inadvisable without further instructions from my government.

"To pass the time profitably I set out, with some of my crewmen, of course, to explore the highest peak of Copernicus. From that vantage point I hoped to obtain . . ."

"Never mind that." Gavin was becoming tired and edgy. "Come to the point."

"That exploration party was a stroke of genius on my part, as you soon shall see," Brown continued as though he had not been interrupted. "It also was a frightening experience . . . for my men, I mean. The forbidding aspect of the moon far exceeds

" 'The grandeur of the dooms
We have imagined for the
mighty dead.' "

"None of yer poetry," cried little Judge Hawkins of Australia. He was on the edge of his chair biting his nails. "Tell us w'at you *found*."

"I'm coming to that, sir. After several hours spent hopping dangerously upward from cliff to crumbling cliff I came upon what appeared to be a tripod or steeple built of metal scaffolding.

" 'Troops' I cried to my men through my helmet mike, 'somebody must have moved the Seattle Space Needle up here.' "

"An original cry," Gavin said.

"Well, that's what it looked like!" Brown flushed as the shot went home, "except that it was many times taller. It was awe-inspiring.

" 'Then felt I like some watcher of the skies
When a new . . .' "

"We want to know w'at you saw, not 'ow John Keats felt!" demanded Hawkins.

"Brown," Gavin rapped, "people here are becoming hysterical. I don't know how much longer I can control them. Be brief. If you can."

"Yes, Your Honor." Horace real-

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ized at last that his grandstanding was off-limits. "The spire was inaccessible from the ground, despite the moon's low gravity. We got near enough, however, for our scintillation counters to determine that it was sending a powerful beam of modulated radiation toward some point in the sky. That modulation was changing constantly, which made me think that the thing had sensed our presence and was sending out information about us."

"What did you do then?"

"I rushed back to my ship and, at earthrise, reported to my government in code. I was told to maintain radio silence. Several hours later I was advised to discuss the matter with the Russians. I did so against my better judgment, although"—he bowed grandly to his fellow pilot—"I found Captain Ivanovna both co-operative and charming.

"We returned to the tripod together to confirm my discovery and to take telephoto photographs of an inscription which ran around its base. Although worn by ages of exposure to intense sunlight, heat and cold, this inscription was still distinct. Here are some photographs of it. You will note that the top line resembles the cuniform imprints found on Sumerian clay tables. The second line, I am told, has a faint resemblance to even earlier Egyptian pictographs. The third line, a cursive script, is like nothing I have ever seen."

Court and correspondents went into separate huddles over the prints.

"An extraterrestrial Rosetta Stone?" Gerry asked of nobody in particular. "What price cold war now?"

"It's some capitalist trick," muttered the Tass correspondent. "Brown carried the prefabricated thing with him."

"What about the radiation?" Reuters asked.

"Now I say!" thundered the *Times*. "The whole world's being spied on. Quite a joke on you, Tass."

"Has the inscription been deciphered?" Gavin finally asked.

"Not to my knowledge," the lieutenant replied. "I'm told that cryptographers are working on it in Washington and Moscow."

"Ha!" Gavin snorted. "This is no cryptogram. It is a message written as plainly as possible for the far future to read. Judge Sholem, you have some knowledge of Sanskrit and other ancient languages. What do you make of it?"

The judge picked up a photograph as though it were a snake, turned it in all directions, studied it through a pocket magnifying glass, then shook his lank ringlets.

"Ezekiel only knows," he confessed. "The first two lines possibly may go back to the very dawn of terrestrial writing. A few characters seem vaguely familiar. I get the sense of a warning or, it may even be, an invitation.

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"There is one symbol here . . ." He sketched briefly on a pad of paper and held it up for all to see. It was a circle with a short arrow pointing upward from its circumference toward the right.

"That," the justice from Israel quavered, "is one of mankind's oldest signs. It may mean male, iron, Tuesday, the god of war, or the planet Mars. Take your pick."

Gavin shuffled the photos together with shaking hands. The excitement of the past hour was taking its toll of his alcohol-starved nerves, and he licked his lips repeatedly.

"What about the U. S. claim to ownership, Lieutenant Brown?" he asked.

"Revoked, over my protest," the big man said as though the words would choke him.

Gavin looked toward the table at the right and said in a voice that was scarcely audible:

"Herr Gottlieb, does the Lunar Corporation still lay claim to the moon despite this proof of prior ownership?"

"Nein! The German bounced up as though stung. "Nein, nein, nein! This problem for the United Nations now is."

"And what a problem," sighed the Chief Justice. "While it is being solved this court stands adjourned sine die. All statements about what we have just heard must come through the Secretariat. Tapes, films and notes taken during the proceedings shall be impounded by the clerk. Guard your tongues.

"Just one thing more: I invite Captain Ivanovna, Colonel Kane and Lieutenant Brown to be my dinner guests tonight at Schevenigen where I intend to fall off the water wagon with a resounding crash."

"I am sorry," said Kane. "I am a semi-invalid and my doctor has ordered me to bed for a long rest. I thank you."

"I must return to Washington at once to confer with my President," said Brown. "We must scotch this menace . . . Uh . . . I also thank you."

"I shall be happy to join you in your fall," said Ivanovna. "Vodka seems called for at this juncture in human affairs"

"Excellent!" Gavin showed signs of returning energy. "I shall ask a friend to join us. Gerry! Come here, confound you, and help me up!" ■

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HYDROGEN FUSION REACTOR

Fossil fuels are running out; under the tremendous and exponentially increasing energy demands of high-power technology they'll run out faster yet. Uranium-thorium is definitely limited. But hydrogen represents one fuel supply we don't run out of—if we can learn to use it!

BY EDWARD C. WALTERSCHEID

The degree and sophistication of man's civilization are largely dependent on the energy sources which that civilization uses. Indeed, the complexity of modern civilization seems to bear a direct relationship to the bass production and efficient use of energy. So it is that we seek constantly after new forms of energy and—above all—an abundant fuel from which cheap and universally available energy can be obtained.

Surprisingly enough, such a fuel exists. The oceans of the earth contain such an abundance of it that were it to be effectively utilized it would supply mankind's energy needs for millions of years to come. The fuel is deuterium and the thermonuclear reactions it undergoes yield more energy per unit mass of fuel than any other process known to man.

For almost fifteen years a concerted effort has been underway in this country, as well as several others, to achieve the controlled release of energy from thermonuclear reactions. This article is a brief description of these efforts.

No self-sustaining controlled thermonuclear reaction has yet been achieved on this earth. Nor is such a reaction likely to be brought about in the near future. To be sure, thermonuclear reactions have occurred in the laboratory, but always under conditions that required much more energy than was ever liberated. In opposition to this last statement, it can be argued that the catastrophic release of thermonuclear energy associated with the detonation of an H-bomb awesomely overshadows the fission energy required to trigger its release. But—while such a reaction might be said to be controlled in the broadest sense of the word—fortunately for all concerned it most certainly is not self-sustaining.

Yet we are dependent for our very existence upon self-sustaining thermonuclear fusion processes which the sun controls quite nicely. The fact that the sun does it so well is of little help to us who would rather do it ourselves—for it seems obvious that the huge size and mass of the sun are responsible for its success.

Lawrence Radiation Laboratory

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Astronomers are fond of telling us about the tremendous energy output of the sun. The fact that the numbers are indeed large—3.7×10^{33} ergs/sec—tends to foster the idea that the sun is a tremendously efficient energy machine. At first glance, it would seem that if we could only duplicate its technique, all of our energy problems would be solved.

But would they? Not on your life! If the average adult male had to rely on the same rate of energy output per pound of mass as that produced by the sun, he would gradually wither away and die. A simple calculation provides the evidence. Divide the sun's energy output by its mass (4.5×10^{33} lb) and we find a rate of energy release of about 8.2×10^{2} ergs/lb/sec.

Now the basal metabolism rate of this average adult male is roughly 77 cal/hr. Assume he weights 150 lb, change cal/hr to ergs/sec, do the necessary arithmetic, and you discover that he is producing energy at the rate of about 6×10^{8} ergs/lb/sec—or a rate over seven times faster than the sun. To put the clincher on the argument, this average adult male is not exercising in any way; he is simply lying there breathing.

This indictment of the sun as an energy source is based on the principle that energy produced divided by the total weight of the energy-producing machine is fully as important a measure of efficiency as is the old standby: energy produced per weight of fuel consumed. On this basis the sun is a lot less efficient than you or I at producing energy.

Duplicating nature then is not enough. What is needed in this context is an energy source that yields a rate of energy release per pound of matter involved that is several million times faster than anything produced in nature—including supernovas. We have one; our problem is that we can't precisely control it. I refer, of course, to the H-bomb.

The highest yield bomb that this country admits to having produces 24 megatons of energy in a time considerably less than a second. Suppose this bomb weighs 20,000 lb and that the energy release does occur in a second. Then by the same arithmetic process used earlier the rate of this energy release is found to be 5×10^{19} ergs/lb/sec.

Both the sun's controlled—but mediocre—rate of energy release and this uncontrolled—but impressive—rate of energy release occur as the result of thermonuclear reactions. Using such reactions, we seek today to achieve a self-sustaining, controlled rate of energy release that will be at some median between these two.

In our quest for controlled thermonuclear energy, however, we owe much to the sun. For it was in the explanation of the sun's tremen-

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dous energy output that we became aware of the awe-inspiring potential of thermonuclear energy.

For over a century astronomers have marveled at the seemingly inexhaustible energy sources of the stars. It was long thought that stellar energy was produced as a result of gravitational work being converted into heat through a process of contraction. However, the sun ultimately refuted this idea by proving to be much older than any theory of gravitational contraction could explain.

The discovery of radioactivity at the end of the Nineteenth Century seemed to offer another possible explanation of stellar energy. Although no one could account for the energy of radioactivity, it seemed reasonable to presume that "atomic energy," which was held to be vaguely responsible for radioactivity, was also contributing to stellar energy.

In 1920 the first explanation of stellar energy as resulting from the conversion of hydrogen to helium was put forth by the British astronomer A. S. Eddington. This hypothesis seemed to be substantiated by the large amounts of hydrogen and helium known to exist in the sun; but it suffered from one very major defect—it could offer no satisfactory mechanism to explain just how hydrogen was transformed into helium.

Then some thirty odd years ago the D-D (deuterium-deuterium) fusion reaction was discovered. Deuterium, a naturally occurring heavy isotope of hydrogen, consists of a neutron and a proton in the nucleus and an associated electron. During experiments in which a beam of high-energy deuterons (ionized deuterium) was allowed to impinge on a heavy water (deuterium oxide) target, it was found that particles were occasionally given off that had energies of several million electron volts (MeV). Since these particle energies were ten to a hundred times greater than the energy of the original deuteron beam, it could only be concluded that a reaction releasing a very considerable amount of energy was occurring.

It was subsequently shown that what was happening was this. When two deuterons approach one another very closely, one nucleus may capture a neutron or proton from the other, thus forming either hydrogen-3 (tritium) or helium-3. The tritium-forming reaction is accompanied by an energy release of 4 MeV while the helium-3 reaction releases 3.25 MeV. This then appeared to be proof positive that hydrogen nuclei—or at least deuterons—could play a key role in stellar energy release.

At this point the astrophysicists cleared away the last objection to Eddington's hypothesis by providing a mechanism for the hydrogen-to-helium transformation. In 1939 H. Bethe in the United States and

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C. F. von Weizsacker in Germany independently came up with the so-called carbon cycle. Basically, the fusion events in this cycle occur as follows:

$$p + C^{12} \longrightarrow N^{13} + \text{energy}$$
$$N^{13} \longrightarrow C^{13} + e^{+}$$
$$p + C^{13} \longrightarrow N^{14} + \text{energy}$$
$$p + N^{14} \longrightarrow O^{15} + \text{energy}$$
$$O^{15} \longrightarrow N^{15} + e^{+}$$
$$p + N^{15} \longrightarrow C^{12} + He^{4}$$

where p is a proton (hydrogen nucleus), C is a carbon nucleus, N is a nitrogen nucleus, O is an oxygen nucleus, He is a helium nucleus, and e^{+} is a positron. The total reaction is:

$$4p \longrightarrow He^{4} + 26.7 \text{ MeV}$$

It has since been learned that the same end result occurs in a set of reactions known as the proton-proton chain. Here the suggested sequence is:

$$p + p \longrightarrow D + e^{+} + \text{energy}$$
$$D + p \longrightarrow He^{3} + \text{energy}$$
$$He^{3} + He^{3} \longrightarrow He^{4} + 2p + \text{energy}$$

Again the net reaction is:

$$4p \longrightarrow He^{4} + 26.7 \text{ MeV}$$

These fusion reactions are brought about in the average star in the following manner. Deep in the interior, temperatures are on the order of many millions of degrees. At these temperatures all matter is ionized and only a plasma—a gas consisting of charged particles—exists. Because of the very high temperatures, the ions of this plasma—consisting mostly of protons—are energetic enough to pass sufficiently close to each other for fusion or thermonuclear reactions to occur. In fact, the forces of gravitation in the star are so great that the charged particles cannot fly away from one another—although they would very much like to do so—but are forced into repeated contact until a thermonuclear reaction occurs.

While the carbon cycle and proton-proton chain work wonderfully well as stellar processes, they are of no use to us here on earth because they take place so very slowly. This is of little consequence in a star because gravitation guarantees that the thermonuclear reaction must eventually occur.

We have no powerful gravitational force working in our favor, so it seems our only alternative is to speed the course of the reaction. Fortunately, by using deuterium and tritium rather than ordinary hydrogen as our fuel we can do precisely that. More about that later.

High temperatures and the plasma phenomena that result from them are thus the keys to our explanation of stellar energy release. They are also the keys to the useful generation of power from controlled thermonuclear reactions.

It is an elementary law of physics that like charges repel. Consequently, it is no great surprise that nuclei of atoms repel each other

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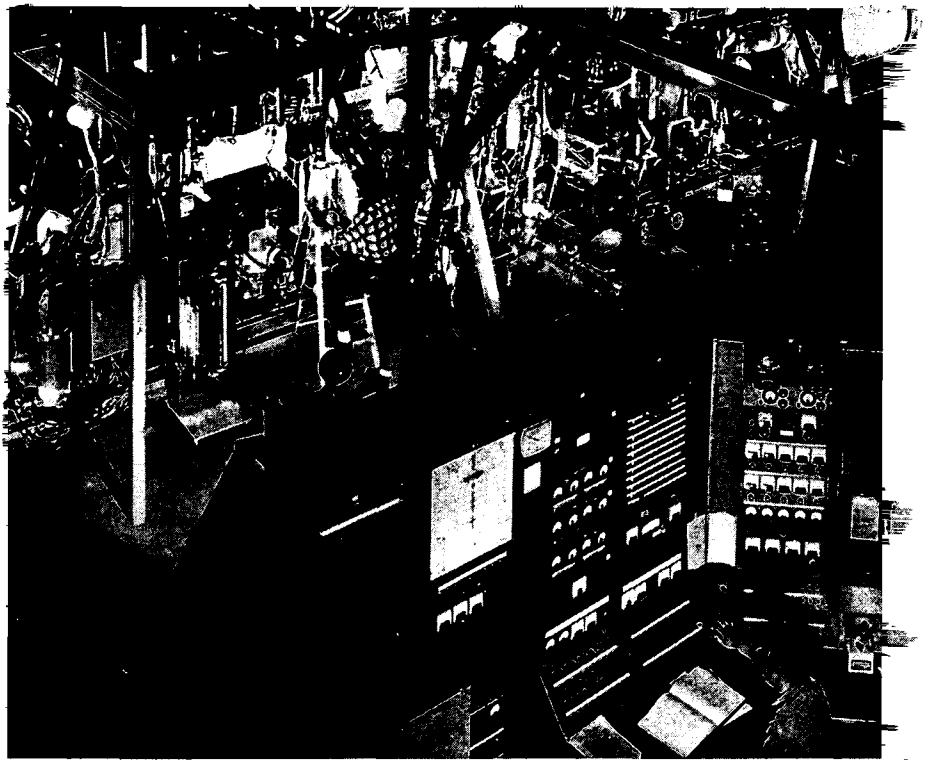

Lawrence Radiation Laboratory

The Alice neutral injection magnetic mirror machine. Ice shown in the photo forms because of the liquid nitrogen used to cool the magnet coils

strongly. The greater the charge on the nucleus, the greater this repulsion tends to be. (This is one reason why only very light nuclei are considered to be worthwhile fuel for controlled fusion reactions. They, of course, have the least nuclear charge.) To overcome this electrostatic repulsion, the nuclei must be made to collide at rather high velocities. For, if two nuclei make sufficiently intimate contact, very short range nuclear forces come into play and the two particles may then fuse into a single large particle. In the process, a portion of their combined mass is converted to energy.

However, even though velocities are sufficiently high for fusion reactions to occur, more often than not the colliding nuclei rebound elastically rather than fuse. Hence, if a self-sustaining reaction is to be brought about, the nuclei must somehow be confined to a region where collisions will occur repeatedly until fusion eventually takes

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place. As was stated earlier, the sun manages this containment through the power of its gravitational field.

By definition though, particles having high velocities (kinetic energy) and confined to a limited area are said to be at high temperatures. The kinetic energies required for nuclei to enter into thermonuclear reactions are the equivalent of 100 million degrees and higher.

Thus exceedingly high temperature is the first requirement for achieving controlled fusion. The second is a rather low plasma density. There are two reasons for this. At the high temperatures required for fusion reactions the kinetic energies of the particles in the plasma cause it to exert a considerable force on whatever is containing it. If this force is to be kept within reasonable bounds, the density of the plasma must be on the order of 10^{15} particles per cubic centimeter —or approximately one ten-thousandth the density of the atmosphere at sea level.

The second reason has to do with the fact that hot matter radiates energy. The rate of radiation increases quite rapidly with increasing temperature. Anyone who has experienced the heat given off by a white-hot object intuitively knows that it radiates heat much more rapidly than a cooler, non-glowing object. The law physicists use to explain this is known as the Stefan-Boltzmann law. It states that dense matter radiates energy at a rate that increases as the *fourth* power of the absolute temperature.

The implications of this are truly staggering. A simple calculation will show that at 100 million degrees—where useful fusion reactions are expected to begin occurring—an object the size of a tennis ball theoretically is radiating more energy than the sun. This, in effect, implies that controlled fusion reactions are virtually impossible to achieve because of the tremendous radiation losses.

Fortunately, there is a way out of this dilemma. The Stefan-Boltzmann law applies only to very dense matter, that is, only objects dense enough to be opaque to incident heat radiation will radiate as this law predicts. But a very thin plasma is almost transparent to such radiation. As a result, its rate of radiation increases only as the *square root* of the temperature. It thus becomes obvious that power from controlled thermonuclear fusion can only be achieved through the use of very-low-density, very-hot plasma.

However, we also can have too much of a good thing. If the density becomes too low the rate of fusion ceases to be of any practical value for power production. So, useful power generation requires that we walk a density tightrope.

Controlled thermonuclear reactions are of academic interest only, unless they are self-sustaining. That is to say, the energy release in the reaction must be sufficiently great

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to maintain the plasma at the fusion temperature. If it is not, the reaction will terminate itself. Thus, a third requirement for useful controlled thermonuclear reactions is that they be self-sustaining.

Earlier it was stated that only light nuclei are worthwhile fuels for controlled fusion reactions. A major reason for this is once again the problem of radiation. Suppose that the plasma is composed of ions formed from atoms of medium atomic number—neon, for example. It is extremely difficult—even at the high temperatures required for fusion—to completely ionize (or strip) all electrons from such atoms. However, when these incompletely ionized atoms collide with free electrons—and, by the nature of the beast, there are plenty of these in any plasma useful for fusion reactions—they radiate energy much more rapidly than the completely ionized species in the plasma. This radiation consists primarily of bremsstrahlung (or x rays).

Clearly, a self-sustaining fusion reaction is impossible if the plasma radiates energy away faster than it produces it. Bremsstrahlung production must therefore be kept at a level at least commensurate with energy generation. The only really effective way to do this is to work with a plasma formed from light atoms—those having low atomic number, i.e., hydrogen, helium, and possibly lithium.

Another consequence of bremsstrahlung radiation is that the "fuel" for controlled fusion must be of very high purity. The presence of even minute quantities of medium or high atomic number contaminants enormously increases the rate of energy radiation. As will be shown later, the problem of contaminants is a very real one—requiring stringent countermeasures. A fourth requirement for obtaining power from controlled fusion reactions then is a very-high-purity, low-atomic-number plasma.

A fifth requirement—and the one most difficult to attain—is that the plasma be confined to a given space for a period sufficiently long that a significant number of fusion reactions occur. It is often stated that no material means of confinement can be used because a plasma at a temperature of many millions of degrees would instantly vaporize any walls with which it came into contact. This is not strictly true; the premise is good but the reason is false. As stated earlier, the density of the plasma necessarily must be quite low. But, because of this, the heat content of even an extremely hot plasma is very low. Rather, material confinement is impossible because the plasma would instantly be cooled and dissipated on touching the walls of a confining chamber.

As a consequence of this, attention must be focused on possible nonmaterial forms of confinement. Gravitation, of course, fits into this category, but—for the reasons giv-

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en earlier—has no possible application in this respect on the earth. The other possible forms of nonmaterial containment are by means of electric or magnetic fields. Magnetic confinement appears to be by far the more promising of the two. While electrical confinement is not entirely ruled out, a major deterrent is than an electric field exerts oppositely directed forces on the two components of the plasma: the electrons and the positive ions. If made to confine one, an electric field tends to allow the other to escape. Such a situation cannot be tolerated since the escaping ions or electrons will carry away too much energy.

Thus, at the present time, magnetic confinement appears to be the only feasible way to contain a plasma at the temperatures necessary for self-sustaining fusion reactions. In this country there are presently five forms of "magnetic bottles" under serious consideration for plasma containment: stellarators (endless tubes), self-confinement and fast-compression methods (pinches), mirror geometries, cusped geometries, and the "Astron" concept. The bottle in each of these approaches consists of strong electromagnetic fields which ideally exert a sufficient inward pressure to counterbalance the outward pressure of the charged plasma particles. Before describing these attempts at containment it is first necessary to review the early status of controlled fusion research.

The Los Alamos Scientific Laboratory was scarcely a year old, and the Manhattan Project had yet to come to its successful conclusion, when a small group of scientists at Los Alamos began work on what was then known as the "Super." Perhaps the most notable among this group and certainly one of its prime movers was Dr. Edward Teller. The "Super" was, of course, the hydrogen bomb, and—because of his efforts—Dr. Teller later achieved somewhat dubious distinction as the "father of the H-bomb." What is not so well known but much more pertinent to the present article is that Teller and others in this Los Alamos group also developed many of the basic principles and laid the foundation for controlled fusion research in this country.

So it was that some fifteen years ago it had already become apparent that magnetic fields offered the best hope for containing a plasma at thermonuclear temperatures. Why this should be so can perhaps best be explained in the following manner.

In the presence of a magnetic field, a charged particle tends to assume a helical orbit about a magnetic line of force. The stronger the magnetic field, the smaller the orbit. In this way a magnetic field acting on a group of charged particles —a plasma, for instance—restricts the movement of these particles

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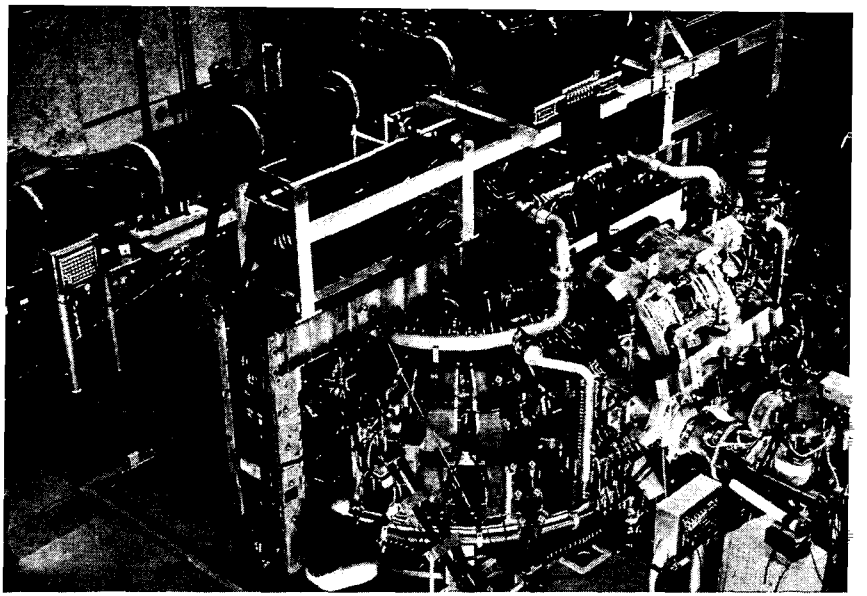

Princeton University

Model C stellarator.

normal or perpendicular to the field. Theoretically, at least, a sufficiently strong magnetic field should be able to provide an effective barrier to the outward pressure exerted by a plasma at thermonuclear temperatures. And—a point which is basic to the whole idea—the magnetic field should be able to do this without absorbing any energy from the particles that it reflects. This, in a nutshell, is the principle of magnetic confinement.

Although a magnetic barrier should be effective, it is not perfect, even in theory. Even though the particles of the plasma may be orbiting in very tight helices about the magnetic lines of force, collisions between particles still occur. Such collisions can transfer a particle from an orbit about one line of force to an orbit about another. By this process, a plasma can slowly diffuse through a strong magnetic barrier, rather in the same fashion that smoke diffuses through a perfectly still room with no air currents. In a stable, strong magnetic configuration, this drift should be so slow as to be of little consequence However, as we shall shortly see, *stable* is the all important word.

Thus far only the motion of charged particles at right angles to the magnetic lines of force has been mentioned. But what of their motion along the lines of force? As it turns out, the particles are completely unimpeded in their motion along these lines. In effect, our bottle has no stopper. One of the basic problems of magnetic confinement is finding the stopper.

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At first glance the simplest solution is to shape the magnetic bottle in the form of a doughnut such that the magnetic lines of force close in on themselves. This is the so-called toroidal configuration and of itself it *won't* work. The fact that this simple solution is useless is a hint of things to come.

It can be shown that a magnetic field externally imposed on a torus is nonhomogeneous, i.e., the magnetic force lines on the inside of the doughnut are closer together than those on the outside of the doughnut. As a result, the charged particles within the plasma do not orbit in tight helices about the force lines, but rather the electrons drift downward and the positive ions upward. This charge separation causes a strong electric field to form. This field in turn causes the plasma particles to drift outward toward the weakest part of the magnetic bottle, where the force lines are more widely separated. The bottle then begins to leak, and the plasma is no longer confined.

It was to get around this inherent weakness in the toroidal concept of magnetic confinement that the stellarator was proposed. In 1951 an astrophysicist, Lyman Spitzer, working at Princeton became intrigued with high-temperature plasmas. He early realized the limitations of the torus but liked the straightforward way it solved the "problem of the ends." Since the toroidal configuration failed because of the buildup of a strong electric field, he reasoned that the thing to do was to prevent the field from forming. He did this by the simple expedient of twisting the torus into a figure eight. This figure eight he called a stellarator.

In the stellarator, charged particles rotating about lines of force and traveling along them find themselves alternately on the inside of a bend and on the outside of one. On the one side of a bend the particles tend to drift in one direction; on the other side they drift just oppositely. The net result is to exactly cancel the drift and thus no electric field forms. The reason for the opposite drifts is that the twisting of the torus has caused a rotation of the magnetic lines of force.

A number of experimental stellarator models have been constructed since 1951. The largest model currently in operation at Princeton is known as the Model C stellarator. Its configuration is considerably altered from that of the earlier models in that it has a racetrack shape. Stabilization of the plasma is achieved by the generation of a secondary magnetic field in the curved sections of the track. The combination of this secondary field with the primary field rotates the primary lines of force. Unfortunately, from the beginning the various stellarators have suffered from plasma instabilities that destroy confinement before the plasma becomes very hot.

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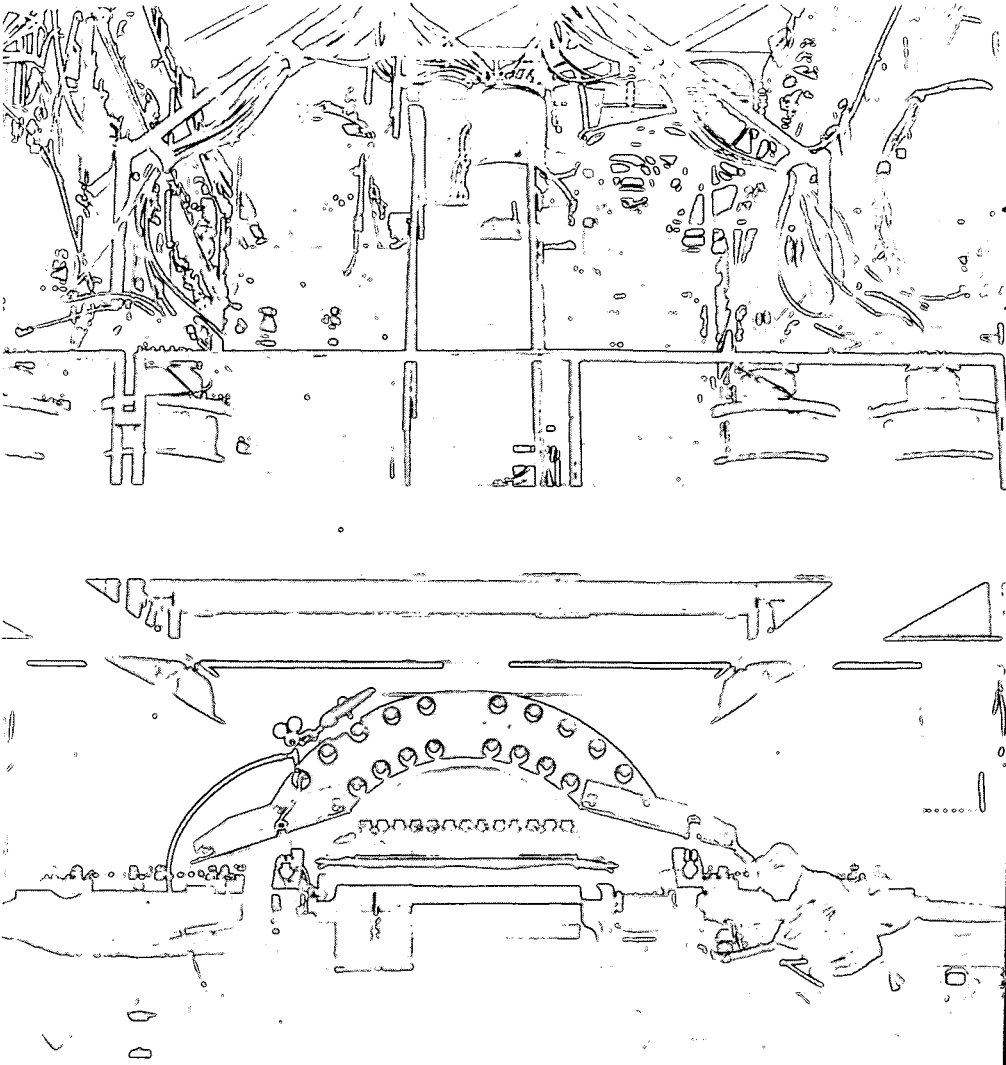

Los Alamos Scientific Laboratory

Scylla IV pinch machine. Scylla machines utilize the "implosion" of a fast-rising magnetic field to compress deuterium gas, achieving by this means the high temperatures and pressures necessary for fusion.

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At about the same time that Spitzer proposed the stellarator concept, J. L. Tuck at Los Alamos began to investigate the so-called simple pinch. Whereas the stellarator makes use of an externally imposed magnetic field for confining the plasma, the simple pinch uses the interaction of a current in a gas and the magnetic field produced by this same current.

Suppose that a plasma is made by passing a current through a gas in a discharge tube. As the current builds up, it produces a magnetic field whose lines of force encircle the plasma. When the current becomes heavy enough, the circular lines of force constrict the plasma to a dense, thin filament. This process caught Tuck's fancy because not only should these magnetic lines of force be an effective container for the plasma, but the very process of constriction should heat the plasma markedly.

Obviously there still exists the problem of the ends, but here we can use a toroidal configuration without fear of the instability caused by an externally imposed magnetic field. The reason for this is that the induced magnetic field lines lie at right angles to those produced by an externally imposed field. It can be shown that, as a result, the plasma drift the stellarator was designed to overcome doesn't exist.

The simple pinch, however, has its own forms of instabilities. These are so great as to preclude the use of a simple pinch for plasma containment and have caused much more complicated pinches to be devised. In many cases, these pinches are a cross between the simple pinch and the stellarator, e.g., magnet coils are wound around the torus so that the confining field comes from both currents in the plasma itself and from the external coils.

Even this form of "magnetically stabilized" pinch is ineffective for plasma containment for any length of time. As a consequence, recent pinch devices have had to seek some other means for achieving stable confinement.

One approach has been the hard-core pinch. This is really a pinch in name only since the plasma filament is replaced by a rod of metal which carries a heavy current. The plasma is confined to the sleeve between the hard core and the external coils by their combined magnetic fields. Theoretically, the hard-core pinch should have much better stability than the older "magnetically stabilized" pinches.

Experiments with the Levitron, a toroidal hard-core pinch at the University of California's Lawrence Radiation Laboratory, have shown that the hard-core pinch does indeed have much better stability characteristics than any of the older pinches.

The Levitron is named for the manner in which it operates. It becomes apparent that any support

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for the metal core interferes with the plasma sleeve and hence is a form of immediate instability. The Levitron gets around this limitation by using rapidly retractable supporting rods for the core. During an experiment the core is actually floating unsupported—for all intents and purposes, it is levitating—hence the name Levitron. Although only a very brief time will pass before the core falls a discernible distance under the force of gravity, this time is long compared with plasma confinement times of interest in this type of experiment. In any case, the core drops only a very short distance before the support rods are re-inserted.

A second—and at least for the present—much more promising approach is the theta pinch which is actively under investigation at Los Alamos and the Naval Research Laboratory in Washington, D.C. Whereas axial pinches—those in which a current flowing axially through a gas forms the magnetic field—operate through the formation of transverse circular magnetic fields, the theta pinch is produced through the formation of a longitudinal magnetic field in the discharge tube. Passage of a sudden high current through a single-turn external loop induces an equal and opposite current to form in the discharge tube. This current is transverse to the length of the discharge tube so that the magnetic field it causes to form is longitudinal to the tube. This may have decided advantages over the older transverse constricting fields.

Because the simple pinch has certain inherent instabilities, serious thought has been given to actually forgetting about stable operation. Instead, a fast, powerful pinch would be produced which would force the plasma to undergo a significant amount of thermonuclear reaction in the brief time before instability occurred. However, a practical thermonuclear reactor making use of such a "fast" pinch would require a tremendous quantity of equipment and would produce energy in the form of minor explosions. Nonetheless, a considerable amount of work is being done—particularly at Los Alamos—to exploit the concept of the fast pinch. The theta pinch just mentioned is an example of a fast pinch.

A third form of magnetic confinement under investigation is the magnetic mirror concept. As mentioned earlier, charged particles rotate in tight helices about magnetic lines of force. In a homogeneous magnetic field the particles move freely along the lines of force. But what happens if at some point the field becomes strongly nonhomogeneous, i.e., the field is made much stronger so that the lines of force tend to pinch in on one another? A particle encountering such a situation experiences a force causing

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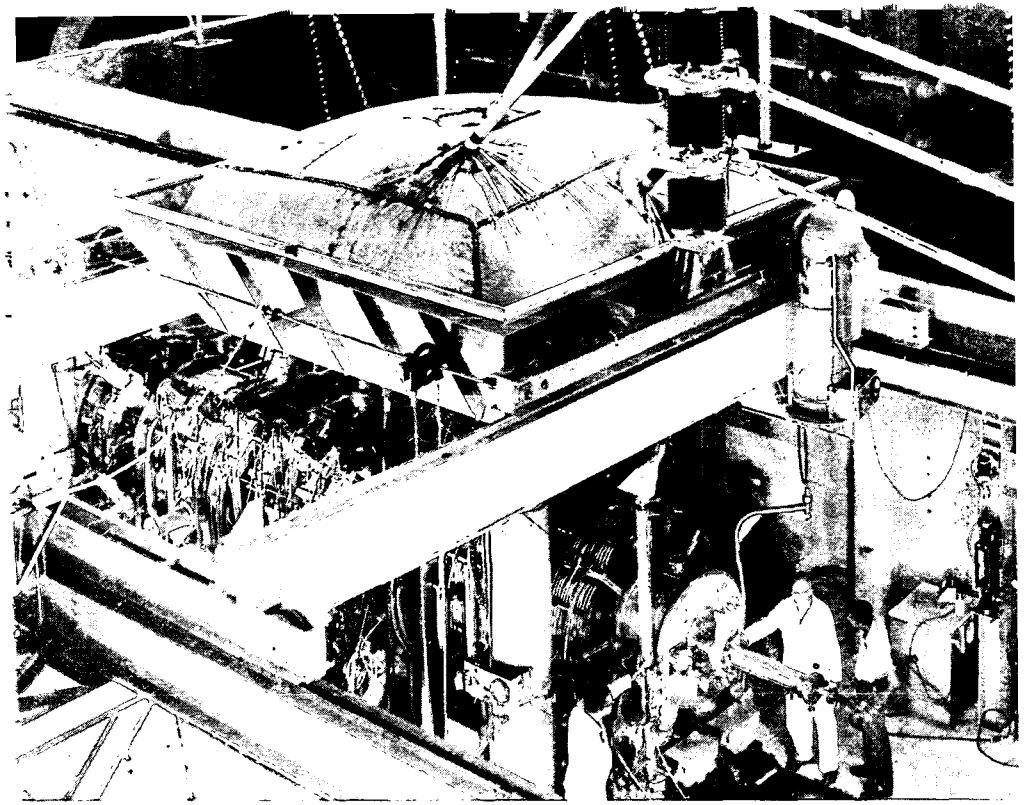

Oak Ridge National Laboratory

DCX-2 (left foreground) and high-voltage power supply (rear). The DCX-2 is an experimental magnetic mirror machine which operates by the injection and dissociation of a 600-keV beam of hydrogen molecular ions to form a dense, hot plasma.

it to reverse its direction and return to the area of weaker magnetic flux. In effect, the strong constricting field serves as a mirror which reflects the charged particles from whence they came. If a similar constricting field is placed at the other end of the homogeneous central field, we have hopefully created an effective magnetic bottle—for the ends have both been stoppered.

This concept of magnetic mirror confinement was first developed at the Lawrence Radiation Laboratory in Livermore, California. A number of experimental mirror machines have been built there; one of the most recent bears the alluring name of Alice. Unfortunately, no one of the feminine gender can claim the honor of having this machine named after her. Alice is an acronym for *a*diabatic *l*ow-energy

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injection and capture experiment.

Magnetic mirror confinement is also being extensively investigated at the Oak Ridge National Laboratory with the DCX-1 and DCX-2 mirror machines.

The three confinement methods just described—stellarator, pinches, and magnetic mirrors—are the main approaches currently being made to the problem of plasma confinement. Before detailing two other approaches under serious consideration in this country it is appropriate to discuss some of the problems encountered with these three main avenues of attack.

These problems are basically three: plasma instabilities, impurity radiation, and charge exchange. Each in itself is sufficient in most cases to destroy any hope of long-term plasma confinement. Often a combination of all three is present.

The most worrisome problem is that of plasma instability. There are two broad types: hydromagnetic instabilities and oscillatory instabilities. The former is by far the more likely to occur and it will be the one with which we shall concern ourselves.

The motion of a plasma as a whole in a magnetic field is usually termed hydromagnetic behavior. When a small initial drift of this type grows rapidly in velocity with time, we have a hydromagnetic instability. A well-known example of this type of instability, first predicted in magnetic mirror machines by Edward Teller, is commonly called the "flute" instability.

Consider a mirror machine in which the central, supposedly homogeneous, magnetic field is not exactly circular so that a slight ridge or "flute" occurs in the surface of the confined plasma. This is a very easy thing to happen since it is difficult to maintain a uniform, circular magnetic field. If such a flute forms, it tends to separate into oppositely charged components. But this in turn causes an electric field to form between the negatively and positively charged parts. Most unfortunately, if the magnetic field lines are bulging outward (as they would be in a mirror machine), this electric field together with the action of the magnetic field will exert an outward force on the plasma flute. We thus have the same type of instability as occurs in a simple torus. The action of the electric field causes the flute to expand and become larger; this then leads to a greater charge separation and faster outward motion of the plasma. If ever there was a vicious circle, this is it. In a very short time our magnetic bottle has not only sprung a leak, it has a gaping hole in it.

Although the example just given refers to a mirror geometry, it has been shown theoretically that the pinch and stellarator are both susceptible to hydromagnetic instabilities. The simple pinch, in particular, is subject to two instabilities of this type.

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In one case constriction during the pinch is not uniform, but slightly greater at some point along the discharge column. This extra constriction causes the current flowing through the column to become more concentrated at that point. But increased current develops a stronger magnetic field which constricts even further. Eventually the constriction becomes so great that the plasma column is cut in half.

The second form of hydromagnetic instability in the simple pinch is the kink instability. Here the plasma column does not remain straight but develops a small bend at some point. This bend or kink causes the magnetic field lines to be closer together at the inner radius and further apart at the outer radius. The stronger field that results at the inner radius pushes the plasma toward the outer radius of the kink where the field is weakened by the spreading of the lines of force. The result inevitably is that the distortion grows rapidly and forces the plasma into contact with the wall of the discharge tube.

The racetrack stellarator with its stabilizing coils, the magnetically stabilized pinch, and the hard-core pinch are all attempts to overcome hydromagnetic instabilities.

Whereas hydromagnetic instability is in many respects a fundamental problem of magnetic containment, impurity radiation is simply a worrisome one. It can be effectively combated; but often stringent measures are required. As the name implies, impurity radiation results from the presence of medium or high atomic weight impurities in the plasma. These impurities are incompletely ionized (as noted earlier, it is extremely difficult to completely ionize such atoms—even at fusion temperatures) and they radiate energy much more rapidly than the completely ionized species in the plasma. Because of this, if impurities are present to any extent, they represent a marked energy loss from the plasma.

Until recently, impurity radiation was one of the major problems of the stellarator program. In the earlier stellarator models a number of impurities were found to be released from the walls of the vacuum chamber during the discharge. In the latest model, the C stellarator, the only impurity of any significance is oxygen. The other impurities have been largely eliminated by "baking" the major components of the vacuum system. This entails heating them to a few hundred degrees Centigrade for several hours to drive off occluded gases. In addition to removing impurities, this "baking" allows much higher vacuums to be attained. Before the advent of bakable vacuum systems, about 10^{-6} torr* was the best vacuum available. Now bakable com-

*A torr is a unit of pressure equivalent to that exerted by one millimeter of mercury at 0°C and standard gravity.

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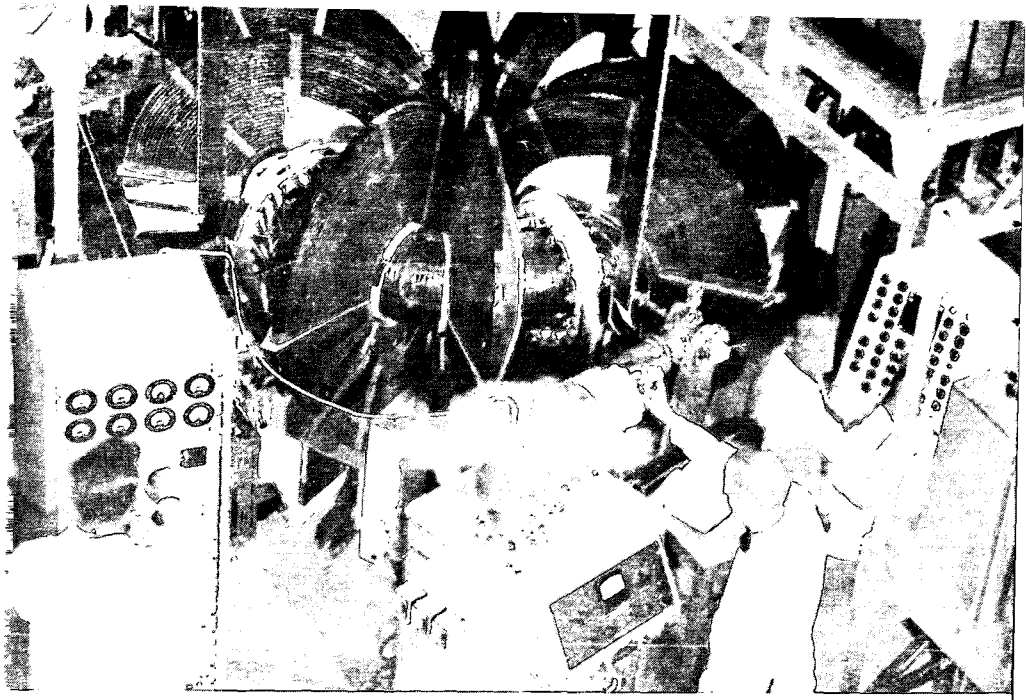

Los Alamos Scientific Laboratory

The Perhapsatron, the first simple toroidal pinch at Los Alamos.

ponents of the vacuum system for the Model C stellarator are designed to hold a vacuum of 10^{-10} torr.

The last import impurity in the Model C stellarator—oxygen—has been reduced from about 3% to about 0.08% of the hydrogen population by the ingenious expedient of adding a "divertor" to the system. With the divertor in operation, the oxygen radiation is totally negligible compared with the hydrogen radiation from the plasma.

As they circle around the stellarator, energetic plasma particles slowly diffuse through the confining magnetic field until they strike the walls of the discharge chamber. It is these particles that are responsible for knocking occluded gases from the chamber walls and thus causing impurity radiation. The divertor operates by diverting the outermost lines of magnetic force into a chamber separate from the main discharge chamber of the stellarator. This means that most of the energetic plasma particles diffusing through to the walls no longer strike them but instead are diverted to the separate chamber where they are neutralized and pumped away.

Supposing that stable magnetic confinement is achieved and no impurities are present, is there any other mechanism which endangers

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the heating of the confined plasma? The answer to this question depends on how much molecular hydrogen is present. By our earlier definition of impurities, hydrogen molecules most certainly cannot be classified as such, but they nonetheless represent a very real danger to the plasma.

Why this should be so is best explained by the following reaction:

(H_2^0) cold + (H^+) hot ⟶

(H_2^+) cold + (H^0) hot

This reaction indicates that, because it is positively charged, an energetic (hot) ion passing near a hydrogen molecule has an excellent chance of stealing an electron from the molecule. The consequences of this are disastrous to the plasma, since it represents a serious mechanism by which energy can be lost. The reason for this becomes readily apparent when one realizes that suddenly neutral—but still energetic—hydrogen (or deuterium or tritium, as the case might be) atoms can pass unhindered through the restraining magnetic field. The mechanism just described is known as charge exchange and it represents the third major problem in achieving controlled thermonuclear fusion.

It might be argued that—in a reasonably good vacuum—so few neutral atoms or molecules would be present that charge exchange would be negligible. The answer to such an argument lies in the definition of what is meant by a "reasonably good" vacuum.

A vacuum sufficient to prevent charge-exchange reactions has to be such that the density of the neutral gas inside the plasma is not greater than about one millionth of a millionth of atmospheric density. Or, as a vacuum engineer would more likely put it, that's getting into the vicinity of 10^{-10} torr and that represents ultrahigh vacuum in anybody's book. It is also a vacuum that was unattainable over a volume of any useful size until only a few years ago. Now Sherwood* scientists and engineers are confident that vacuums of 10^{-12} torr are achievable.

Such vacuums are necessary because a neutral particle represents a target area approximately 100 to 1,000 million times larger than a bare nucleus. To prevent charge exchange reactions from predominating, the density of the neutral particles must be lower than that of the plasma particles by about this same factor. Since the plasma density is only on the order of one ten-thousandths of an atmosphere or less, ultrahigh vacuums are a must.

As is so often the case with the problems associated with controlled fusion research, charge-exchange reactions can have the nasty habit of perpetuating themselves. The process is simple and quite reminiscent of the mechanism giving rise to

*Project Sherwood is the name given to the government-sponsored program to develop controlled fusion in this country.

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impurity radiation in the stellarator. Even if only a few charge-exchange reactions occur initially, the hot, fast traveling neutral particles that result will bombard the walls of the vacuum chamber. The consequences are exactly the same as in the stellarator where charged particles impinged on the walls; occluded or loosely adsorbed gas atoms are knocked loose to enter the plasma where the charge-exchange process begins all over again.

Fortunately, baking vacuum chamber components and using special techniques to achieve ultra-high vacua have largely overcome charge-exchange problems in the newest controlled fusion research machines.

It is time now to return to the last two confinement approaches receiving anything like serious attention. These are cusped geometries and the Astron concept.

Back in the mid-Fifties when hydromagnetic instability reared its ugly head, a search was begun to discover if there was *any* form of magnetic confinement that offered promise of being inherently stable. The result of this search was affirmative—if one was willing to put up with a configuration that was just naturally leaky to begin with. Thus began the study of cusped geometries.

If two coils, carrying current in opposite directions, are brought to within about a diameter of each other, they will generate a "cusped" pattern of magnetic field lines. These field lines enclose a region that looks somewhat like two old-fashioned ice cream cones placed together with their pointed ends opposite one another. This is the plasma confinement region. One of the reasons for the stability of a cusped geometry of this type is that no matter in which direction the plasma exerts pressure, it exerts this pressure against inward rather than outward curving lines of magnetic force.

Most of the work with cusped geometries has been carried out at Los Alamos. A series of experimental machines known as Picket Fence I, II, et cetera, have been used to explore this type of confinement. The major problem thus far has been the natural leakiness of this form of containment. There is some reason to believe, however, that the leaks can be reduced—possibly by combination of the cusped system with some other approach.

In many respects, the Astron concept is the most novel approach to plasma confinement now being considered. Basically, this concept for achieving controlled thermonuclear fusion depends on the use of a rotating cylinder of relativistic electrons, called the E-layer, in conjunction with an external solenoidal magnetic field. The E-layer should strongly modify the solenoidal magnetic field in such a manner as to create a closed pattern of magnetic

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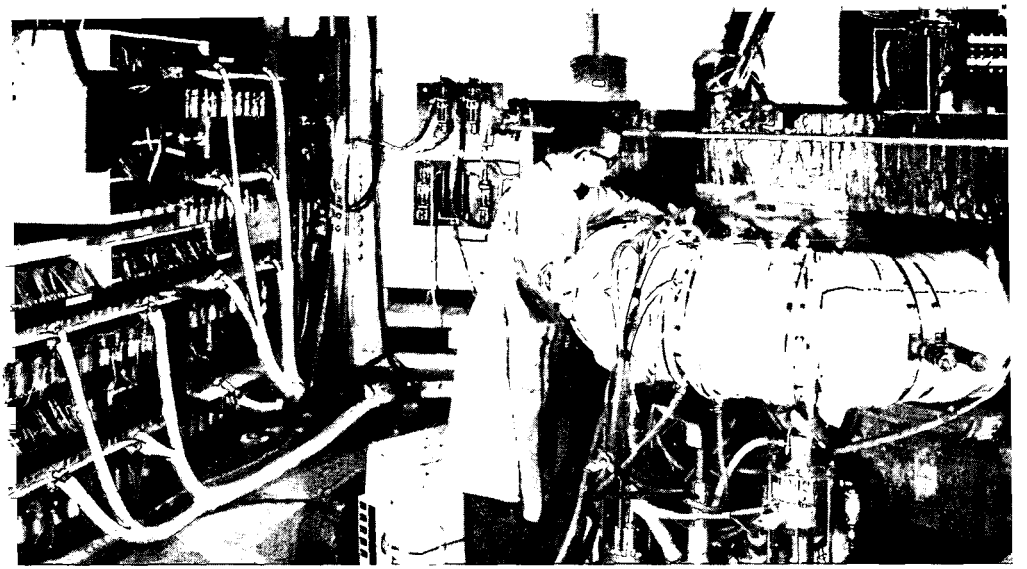

Lawrence Radiation Laboratory

Levitron toroidal pinch experiment. Section wrapped in white tubing actually floats during the short periods of time the pinch operates. This is accomplished by rapidly withdrawing and then replacing the supporting legs.

field lines, i.e., a magnetic bottle. A 200-ampere electron beam with an energy range of 4-5 MeV is required to form the E-layer.

Although the concept was first proposed by Nicholas Christofilos in 1953, work did not begin on an experimental Astron machine until 1957. Since that time, some eight million dollars have been spent and work on the machine is only now —October 1964—nearing completion at the Lawrence Radiation Laboratory in Livermore, California.

The delay in completing the Astron machine has been caused by some difficult technological problems involving the injection and capture of high-current pulses of electrons necessary to form the E-layer. The first tests of the Astron machine will be to confirm that an E-layer actually is formed. It is felt that a stable E-layer can be used to both confine and heat a plasma to thermonuclear temperatures.

These then are the major forms of magnetic containment being investigated in this country. Although effective containment is by far the biggest problem facing the Sherwood program, it is not by any means the only problem. Along with it go the interrelated problems of ion injection and heating.

In general, there are two ways in which plasma injection and heating have been approached. In the first, a cold gas at moderate density

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—somewhere around 10^{13} to 10^{16} atoms/cc—is ionized to form a low-temperature plasma which is then heated to thermonuclear temperatures in a confined region.

The second approach is just the opposite. Here, the particles already have kinetic energeis sufficiently high for fusion reactions to occur. The idea is to get them within a confining field at a density sufficiently high to maintain thermonuclear reactions, and—while so doing—to randomize the particle motions away from the initial directed velocities. This requires some ingenious methods of injection and trapping.

For convenience, the two approaches just described can be called low- and high-energy injection, respectively. Both the various axial pinches and the theta pinch make use of low-energy injection. In its initial phase of operation so does the stellarator. In the pinches and the stellarator, initial heating occurs when a heavy current is passed through a cold, moderately dense gas. Such a current first ionizes the gas and then heats it, much in the manner that electricity flowing through the tungsten filament of a light bulb heats it to incandescence. This is a very simple form of heating, but it has two limitations. The first of these is that the presence of high current in a plasma may easily create instabilities that destroy confinement before much heating is accomplished. The second, and much more fundamental limitation, is that resistance heating has an upper limit of about one million degrees—much below that required for fusion reactions.

In the pinches, however, resistance heating is only the first stage in the heating process. The plasma is heated primarily by a process known as fast magnetic compression. Fast magnetic compression occurs when the magnetic field in the pinch constricts. Temperatures greater than 23 million degrees have been achieved in theta pinches at Los Alamos.

The initial resistance heating in the stellarator is known as ohmic heating. Thus far this is the only type of heating that has been attempted and temperatures of only about 500,000 degrees have been achieved. A method which hopefully will provide much greater heating when incorporated into the Model C stellarator is known as magnetic pumping. This process depends on the fact that alternately squeezing and expanding a plasma at just the right resonance frequency causes the ions in the plasma to gain energy. The obvious way to compress and expand the plasma is by means of the confining magnetic field—hence "magnetic pumping." A problem is that such pumping may stimulate plasma instabilities.

Certain magnetic mirror machines make use of low-energy injection and then heat the plasma by a process known as adiabatic com-

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pression. The problem in these machines is somewhat different than in the pinches because there is no current to create both the plasma and the confining field. Instead, the plasma must somehow be injected through the confining field and then trapped. This is not as easy as it may at first sound, for a magnetic bottle that effectively confines a plasma just as effectively keeps charged particles that are outside from getting in.

Plasma injection is accomplished by firing a burst of plasma from a "plasma gun" through a very weak confining field. Before the plasma reaches the magnetic mirror at the far end of the machine, the confining field is rapidly increased in strength. This not only traps the plasma but strongly compresses it as the strength of the confining field continues to increase. This continued compression, known as adiabatic compression, can heat the plasma to thermonuclear temperatures.

At the Lawrence Radiation Laboratory adiabatic compression has been refined to a rather fine art. For example, in a mirror machine known as Toy Top III adiabatic compression occurs in three successive stages. The compressed plasma is pushed from one stage to the next by means of a moving magnetic mirror. Toy Top III has heated plasma to 36 million degrees.

Several mirror machines now in operation go directly to the core of the matter and use high-energy injection. The Alice machine serves as an excellent example. The particles injected into the confinement region in Alice have an energy of 20,000 electron volts. This is equivalent to a plasma temperature of some 140 million degrees. Alice's problem is one of maintaining a sufficiently strong magnetic field to confine these energetic particles while at the same time somehow managing to inject them through this confining field.

Alice does it by first generating an intense beam of 20-keV hydrogen or deuterium ions by means of an ion source. These energetic ions then pass through a chamber filled with hydrogen gas at moderate pressure. By charge-exchange reactions, the major portion (about 80%) of the beam is converted to energetic—but neutral—atoms. These atoms have no difficulty whatsoever in penetrating into the confinement region in Alice. There a part of the beam is ionized through either charge-exchange reactions with residual gas molecules or through a process known as Lorentz ionization.

An ion density of about 10^8 particles/cc has been observed in the Alice machine. This particle density was achieved with an operating vacuum of 10^{-8} torr, about ten times higher than intended. It is expected that lowering the operating vacuum to 10^{-9} torr will substan-

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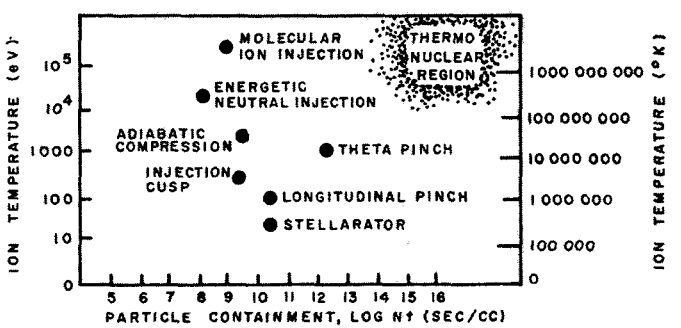
tially increase the density of the confined plasma.

The DCX mirror machines at the Oak Ridge National Laboratory also make use of high-energy injection. Instead of a neutral beam of particles, however, the latest of these machines uses a beam of molecular ions accelerated to 600,000 electron volts. These molecular ions—hydrogen molecules which have lost an electron—move in larger arc in a magnetic field than do atomic ions of equal velocity. If they can be made to penetrate into the interior of the DCX mirror configuration and then broken up, the atomic ions remaining cannot leave because they now move in too small a circle. A density of about 10^{10} particles/cc has been achieved in the latest DCX machine.

Before closing this article, the conditions necessary to achieve useful controlled fusion reactions should be defined. First of all, the ions in the confined plasma must have a temperature on the order of 10,000 to 100,000 electron volts. (As called out earlier, 20,000 electron volts is roughly equivalent to 140 million degrees.) Secondly, the product Nt, where N is the density of the plasma and t is the confinement time, has to be about 10^{15} sec/cc. The status—as of the end of 1963—of the various approaches called out here in meeting these requirements is shown below. It has taken a decade and some 200 million dollars for the Sherwood Program to achieve this much. The time and the money ultimately required for controlled thermonuclear fusion to become a reality depend to a very considerable extent on the priority which we, as a nation, are willing to give it. ■



Status of the various U.S. controlled fusion programs as of the end of 1963. Adapted from a chart originally appearing in the March 1964 issue of PHYSICS TODAY.

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THE gm EFFECT

The Truth
has long been held high
as an ideal.
But maybe Man holds Truth
so high in hopes
he won't bump into it?

FRANK HERBERT

Illustrated by Robert Swanson

It was a balmy fall evening and as Dr. Valeric Sabantoce seated himself at the long table in Meade Hall's basement seminar room, he thought of how the weather would be sensationalized tomorrow by the newspapers and wire services. They would be sure to remark on the general clemency of the elements, pointing out how Nature's smiling aspect made the night's tragedy so much more horrible.

Sabantoce was a short, rotund man with a wild shock of black hair that looked as though it had never known a comb. His round face with its look of infant innocence invariably led strangers to an incorrect impression—unless they were at once exposed to his ribald wit or caught the weighted stare of his deeply-socketed brown eyes.

Fourteen people sat around the long table now—nine students and five faculty—with Professor Josua Latchley in the chairman's seat at the head.

"Now that we're all here," Latchley said, "I can tell you the purpose of tonight's meeting. We are faced with a most terrible decision. We . . . ahhh—"

Latchley fell silent, chewed at his lower lip. He was conscious of the figure he cut here—a tall, ungainly bald man in thick-lensed glasses . . . the constant air of apology he wore as though it were a shield. Tonight, he felt that this appearance was a disguise. Who could guess—except Sabantoce, of course—at the daring exposed by this seemingly innocent gathering?

"Don't leave 'em hanging there, Josh," Sabantoce said.

"Yes . . . ahh, yes," Latchley said. "It has occurred to me that Dr. Sabantoce and I have a special demonstration to present here tonight, but before we expose you to that experiment, as it were, perhaps we should recapitulate somewhat."

Sabantoce, wondering what had diverted Latchley, glanced around the table—saw that they were *not* all there. Dr. Richard Marmon was missing.

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Did he suspect and make a break for it? Sabantoce wondered. He realized then that Latchley was stalling for time while Marmon was being hunted out and brought in here.

Latchley rubbed his shiny pate. He had no desire to be here, he thought. But this had to be done. He knew that outside on the campus the special 9:00 P.M. hush had fallen over Yankton Technical Institute and this was his favorite hour for strolling—perhaps up to the frosh pond to listen to the frogs and the couples and to think on the etymological derivations of—

He became conscious of restless coughing and shuffling around the table, realized he had permitted his mind to wander. He was infamous for it, Latchley knew. He cleared his throat. *Where the devil was that Marmon? Couldn't they find him?*

"As you know," Latchley said, "we've made no particular efforts

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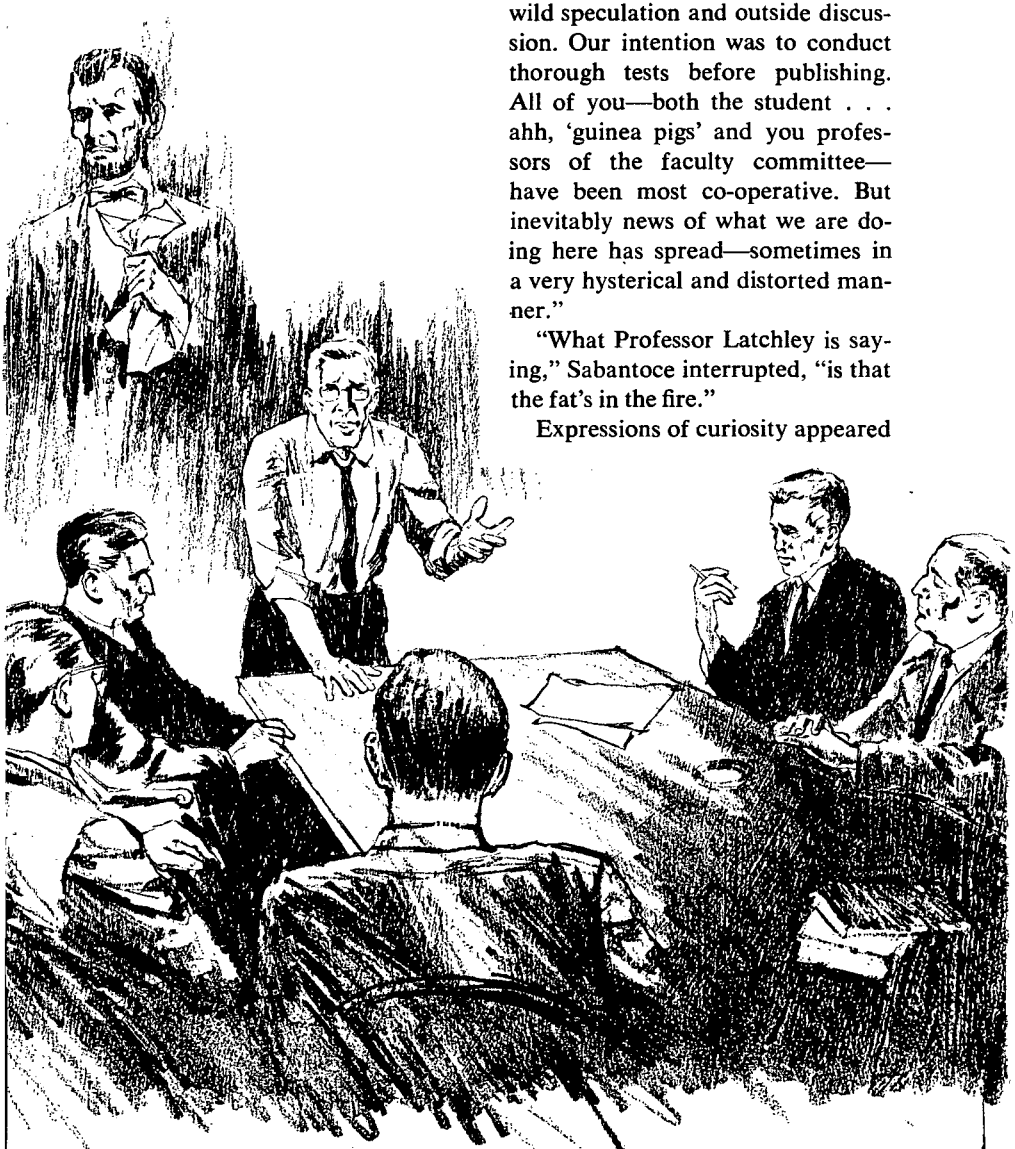
to keep our discovery secret, although we've tried to discourage wild speculation and outside discussion. Our intention was to conduct thorough tests before publishing. All of you—both the student . . . ahh, 'guinea pigs' and you professors of the faculty committee—have been most co-operative. But inevitably news of what we are doing here has spread—sometimes in a very hysterical and distorted manner."

"What Professor Latchley is saying," Sabantoce interrupted, "is that the fat's in the fire."

Expressions of curiosity appeared



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on the faces of the students who, up to this moment, had been trying to conceal their boredom. Old Dr. Inkton had a fit of coughing.

"There's an old Malay expression," Sabantoce said, "that when one plays Bumps-a-Daisy with a porcupine, one is necessarily jumpy. Now, all of us should've known this porcupine was loaded."

"Thank you, Dr. Sabantoce," Latchley said. "I feel . . . and I know this is a most unusual course . . . that all of you should share in the decision that must be made here tonight. Each of you, by participating in this project, has become involved far more deeply here than is the usual case with scientific experiments of this general type. And since you student *assistants* have been kept somewhat in the dark, perhaps Dr. Sabantoce, as original discoverer of the GM effect, should fill you in on some of the background."

Stall it is, Sabantoce thought.

"Discovery of the genetic memory, or GM effect, was an accident," Sabantoce said picking up his cue. "Dr. Marmon and I were looking for a hormonal method of removing fat from the body. Our Compound 105 had given excellent results on mice and hamsters. We had six generations without apparent side effects and that morning I had decided to try 105 on myself."

Sabantoce allowed himself a self-deprecating grin, said: "You may remember I had a few excess pounds then."

The responsive laughter told him he had successfully lightened the mood which had grown a bit heavy after Latchley's portentous tone.

Josh is a damn' fool, Sabantoce told himself. *I warned him to keep it light. This is a dangerous business.*

"It was eight minutes after ten A.M. when I took that first dosage," Sabantoce said. "I remember it was a very pleasant spring morning and I could hear Carl Kychre's class down the hall reciting a Greek ode. In a few minutes I began to feel somewhat euphoric—almost drunk, but very gently so—and I sat down on a lab stool. Presently, I began reciting with Kychre's class, swinging my arm to the rhythm of it. The next thing I knew, there was Carl in the lab door with some students peering in behind him and I realized I might have been a bit loud."

" 'That's magnificent archaic Greek but it *is* disturbing my class,' Carl said."

Sabantoce waited for laughter to subside.

"I suddenly realized I was two people," Sabantoce said. "I was perfectly aware of where I was and who I was, but I also knew quite certainly that I was a Hoplite soldier named Zagreut recently returned from a mercenary venture on Kyrene. It was the *double-exposure* effect that so many of you

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have remarked. I had all the memories and thoughts of this Hoplite, including his very particular and earthy inclinations toward a female who was uppermost in his/my awareness. And there was this other thing we've all noticed: I was thinking his/my thoughts in Greek, but they were cross-linked to my dominant present and its English-based awareness. I could translate at will. It was a very heady experience, this realization that I was two people."

One of the graduate students said: "You were a whole mob, Doctor."

Again, there was laughter. Even old Inkton joined in.

"I must've looked a bit peculiar to poor Carl," Sabantoce said. "He came into the lab and said: 'Are you all right?' I told him to get Dr. Marmon down there fast . . . which he did. And speaking of Marmon, do any of you know where he is?"

Silence greeted the question; then Latchley said: "He's being . . . summoned."

"So," Sabantoce said. "Well, to get on: Marmon and I locked ourselves in the lab and began exploring this thing. Within a few minutes we found out you could direct the subject's awareness into any stratum of his genetic inheritance, there to be *illuminated* by an ancestor of his choice; and we were caught immediately by the realization that this discovery gave an entirely new interpretation to the concept of instinct and to theories of memory storage. When I say we were excited, that's the understatement of the century."

The talkative graduate student said: "Did the effect fade the way it does with the rest of us?"

"In about an hour," Sabantoce said. "Of course, it didn't fade completely, as you know. That old Hoplite's right here with me, so to speak —along with the rest of the *mob*. A touch of 105 and I have him full on—all his direct memories up to the conception-moment of my next ancestor in his line. I have some overlaps, too, and later memories of his through parallel ancestry and later siblings. I'm also linked to his maternal line, of course—and two of you are tied into this same fabric, as you know. The big thing here is that the remarkably accurate memories of that Hoplite play hob with several accepted histories of the period. In fact, he was our first intimation that much recorded history is a crock."

Old Inkton leaned forward, coughed hoarsely, said: "Isn't it about time, doctor, that we did something about that?"

"In a way, that's why we're here tonight," Sabantoce said. And he thought: *Still no sign of Marmon. I hope Josh knows what he's talking about. But we have to stall some more.*

"Since only a few of us know the full story on some of our more sensational discoveries, we're going

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to give you a brief outline of those discoveries," Sabantoce said. He put on his most disarming smile, gestured to Latchley. "Professor Latchley, as historian-coordinator of that phase in our investigations, can carry on from here."

Latchley cleared his throat, exchanged a knowing look with Sabantoce. *Did Marmon suspect?* Latchley asked himself. *He couldn't possibly know . . . but he might have suspected.*

"Several obvious aspects of this research method confront one immediately," Latchley said, breaking his attention away from Sabantoce and the worry about Marmon. "As regards any major incident of history—say, a battle—we find a broad selection of subjects on the victorious side and, sometimes, no selection at all on the defeated side. Through the numerous cross references found within even this small group, for example, we find remarkably few *adjacent* and incidental memories within the Troy quadrant of the Trojan wars—some female subjects, of course, but few males. The male bloodlines were virtually wiped out."

Again, Latchley sensed restlessness in his audience and felt a moment of jealousy. Their attention didn't wander when Sabantoce was speaking. The reason was obvious: Sabantoce gave them the dirt, so to speak.

Latchley forced his apologetic smile, said: "Perhaps you'd like a little of the real dirt."

They did perk up, by heaven!

"As many have suspected," Latchley said, "our evidence makes it conclusive that Henry Tudor did order the murder of the two princes in the Tower . . . at the same time he set into motion the propaganda against Richard III. Henry proves to've been a most vile sort—devious, cruel, cowardly, murderous—political murder was an accepted part of his regime." Latchley shuddered. "And thanks to his sex drive, he's an ancestor of many of us."

"Tell 'em about Honest Abe," Sabantoce said.

Latchley adjusted his glasses, touched the corner of his mouth with a finger, then: "Abraham Lincoln."

He said it as though announcing a visitor and there was a long pause.

Presently, Latchley said: "I found this most distressing. Lincoln was my particular hero in childhood. As some of you know, General Butler was one of my ancestors and . . . well, this was *most* distressing."

Latchley fumbled in his pocket, brought up a scrap of paper, studied it, then: "In a debate with Judge Douglas, Lincoln said: 'I tell you very frankly that I am not in favor of Negro citizenship. I am not, nor ever have been, in favor of bringing about in any way the social and political equality of the white and

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black races; that I am not nor ever have been, in favor of making voters or jurors of Negroes, nor of qualifying them to hold office, nor to intermarry with white people. I will say in addition that there is a physical difference between the white and black races, which, I suppose, will forever forbid the two races living together upon terms of social and political equality; and in as much as they cannot so live—while they do remain together—there must be the position of the superiors and the inferiors; and that I, as much as any other man, am in favor of the superior being assigned to the white man.' "

Latchley sighed, stuffed the paper into a pocket. "Most distressing," he said. "Once, in a conversation with Butler, Lincoln suggested that all Negroes should be deported to Africa. Another time, talking about the Emancipation Proclamation, he said: 'If it helps preserve the Union, that's enough. But it's as clear to me as it is to any thinking man in the Republic that this proclamation will be declared unconstitutional by the Supreme Court following the cessation of hostilities.'

Sabantoce interrupted: "How many of you realize what hot potatoes these are?"

The faces around the table turned toward him then back to Latchley.

"Once you have the clue of an on-the-scene observer," Latchley said, "you even find correspondence and other records of corroboration. It's amazing how people used to hide their papers."

The talkative graduate student leaned his elbows on the table, said: "The hotter the potato, the more people will notice it, isn't that right, Professor Latchley?"

Poor fellow's bucking for a better grade even now, Sabantoce thought. And he answered for Latchley: "The hottest potatoes are the most difficult to swallow, too."

The inane exchange between Sabantoce and the student left a hollow silence behind it and a deepening sense of uneasiness.

Another student said: "Where's Dr. Marmon? I understand he has a theory that the more GM we bring into contact with consciousness, the more we're controlled by the dominant brutality of our ancestors. You know, he says the most brutal ones survived to have children and we kind of gloss that over in our present awareness . . . or something like that."

Old Inkton stirred out of his semidaze, turned his sour milk eyes on Latchley. "Pilgrims," he said.

"Ah, yes," Latchley said.

Sabantoce said: "We have eyewitness accounts of Puritans and Pilgrims robbing and raping Indians. Brutality. Some of my ancestors, I'm afraid."

"Tea party," Old Inkton said.

Why doesn't the old fool shut up? Latchley wondered. And he found

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himself increasingly uneasy about Marmon's absence. *Could there have been a double double-cross?* he asked himself.

"Why not outline the Boston Tea Party?" Sabantoce asked. "There're a few here who weren't in on that phase."

"Yes . . . ahhh-mmmm," Latchley said. "Massachusetts had a smuggling governor then, of course. Everybody of consequence in the Colonies was smuggling. Navigation Acts and all that. The governor and his cronies were getting their tea from the Dutch. Had warehouses full of it. The British East India Company was on the verge of bankruptcy when the British Government voted a subsidy—equivalent to more than twenty million dollars in current exchange. Because of this . . . ahh, subsidy, the East India Company's tea could be sent in at about half the price of the smuggled tea—even including the tax. The governor and his henchmen faced ruin. So they hired brigands to wear Indian disguise and dump the East India Company's tea into the harbor—about a half million dollars worth of tea. And the interesting thing is it was better tea than the smugglers had. Another item to note is that the governor and his cronies then added the cost of the hired brigands onto the price charged for their smuggled tea."

"Hot potatoes," Sabantoce said. "And we haven't even gone into the religious issues—Moses and his aides drafting the Ten Commandments . . . the argument between Pilate and the religious fanatic."

"Or the present United States southern senator whose grandfather was a light-skinned Negro," Latchley said.

Again, that air of suspenseful uneasiness came over the room. People turned and looked at their companions, twisted in their chairs.

Sabantoce felt it and thought: *We can't let them start asking the wrong questions. Maybe this was a bad tack to take. We should've stalled them some other way . . . perhaps in some other place. Where is Marmon?*

"Our problem is complicated by accuracy, strangely enough," Latchley said. "When you know where to look, the corroborating evidence is easy to find. The records of that southern senator's ancestry couldn't be disputed."

A student at the opposite end of the table said: "Well, if we have the evidence then nothing can stop us."

"Ahh . . . mmmm," Latchley said. "Well . . . ahh . . . the financial base for our own school is involv . . ."

He was interrupted by a disturbance at the door. Two uniformed men pushed a tall blond young man in a rumpled dark suit into the room. The door was closed and there came the click of a lock. It was an ominous sound.

Sabantoce rubbed his throat.

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The young man steadied himself with a hand against the wall, worked his way up the room to a point opposite Latchley, lurched across to an empty chair and collapsed into it. A thick odor of whisky accompanied him.

Latchley stared at him, feeling both relief and uneasiness. They were *really* all here now. The newcomer stared back out of deep-set blue eyes. His mouth was a straight, in-curving line in a long face that appeared even longer because of an extremely high forehead.

"What's going on here, Josh?" he demanded.

Latchley put on his apologetic smile, said: "Now, Dick, I'm sorry we had to drag you away from wherev . . ."

"Drag!" The young man glanced at Sabantoce, back to Latchley. "Who are those guys? Said they were campus police, but I never saw 'em before. Said I had to come with them . . . vital importance!"

"I told you this was an important meeting tonight," Sabantoce said. "You've . . ."

"Important meeting," the young man sneered.

"We must decide tonight about abandoning the project," Latchley said.

A gasp sounded around the table.

That was clever, Sabantoce thought. He looked down the table at the others, said: "Now that Dr. Marmon is here, we can bring the thing out and examine it."

"Aband . . ." Marmon said and sat up straight in his chair.

A long moment of silence passed. Abruptly, the table erupted to discord—everyone trying to talk at once. The noise subsided only when Sabantoce overrode it, slamming a palm against the table and shouting: "Please!"

Into the sudden silence, Latchley said: "You have no idea how painful this disclosure is to those of us who've already faced the realities of it."

"Realities?" Marmon demanded. He shook his head and the effort he made to overcome the effects of drink was apparent to everyone around the table.

"Let me point out to all of you just one *little* part of our total problem," Sabantoce said. "The inheritance of several major fortunes in this country could be legally attacked—with excellent chances of success—on the basis of knowledge we've uncovered."

Sabantoce gave them a moment to absorb this, then: "We're boat rockers in a world whose motto is 'Don't give up the ship.' And we could tip over quite a few ships."

"Let us face it," Latchley said, picking up his cue from Sabantoce. "We are not a very powerful group."

"Just a minute!" Marmon shouted. He hitched his chair closer to the table. "Bunch of crepe hangers. Where's y'r common sense? We got the goods on a whole bunch of

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bums! Have you any idea how much that's worth?"

From down the table to his left came one explosive word: "Blackmail?"

Latchley looked at Sabantoce with a raised-eyebrows expression that said clearly: "See? I told you so."

"Why not?" Marmon demanded. "These bums have been blackmailing us f'r centuries. 'B'lieve what I tell y', man, or we'll pull y'r arms outa their sockets!' That's what they been tellin's . . . telling us." He rubbed his lips.

Sabantoce stood up, moved around the table and rested a hand lightly on Marmon's shoulder. "O.K. We'll let Dr. Marmon be the devil's advocate. While he's talking; Dr. Latchley and I will go out and get the film and equipment for the little demonstration we've prepared for you. It should give you a clear understanding of what we're up against." He nodded to Latchley, who arose and joined him.

They crossed to the door, trying not to move too fast. Sabantoce rapped twice on the panel. The door opened and they slipped out between two uniformed guards, one of whom closed and locked the door behind them.

"This way, please," the other guard said.

They moved up the hall, hearing Marmon's voice fade behind them: "The bums have always controlled the history books and the courts and the coinage and the military and every . . ."

Distance reduced the voice to an unintelligible murmur.

"Damn' Commie," one of the guards muttered.

"It does seem such a waste," Latchley said.

"Let's not kid ourselves," Sabantoce said as he started up the stairs to the building's side exit. "When the ship's sinking, you save what you can. I think the Bishop explained things clearly enough: God's testing all men and this is the ultimate test of faith."

"Ultimate test, certainly;" Latchley said, laboring to keep up with Sabantoce. "And I'm afraid I must agree with whoever it was said this would produce only chaos—unsettled times . . . anarchy."

"Obvious," Sabantoce said, as he stepped through the outer door being held by another guard.

Latchley and the escort followed.

At once, Sabantoce noted that all the campus lights had been extinguished. *The contrived power failure,* he thought. *They probably switched Meade to an emergency circuit so we wouldn't notice.*

One of their guards stepped forward, touched Latchley's arm, said: "Take the path directly across the quad to the Medical School. Use the back door into Vance Hall. You'll have to hurry. There isn't much time."

Sabantoce led the way down the

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steps and onto the dark path away from Meade Hall. The path was only a suggestion of lighter gray in the darkness. Latchley stumbled into Sabantoce as they hurried, said: "Excuse me."

There was an impression of many moving dark shapes in the shadows around them. Once a light was flashed in their faces, immediately extinguished.

A voice came from the dark corner of a building: "Down here. Quickly."

Hands guided them down steps, through a door, past heavy draperies, through another door and into a small, dimly lighted room.

Sabantoce recognized it—a medical storeroom that appeared to have been emptied of its supplies rather quickly. There was a small box of compresses on a shelf at his right.

The room was heavy with tobacco smoke and the odor of perspiration. At least a dozen men loomed up in the gloom around them—some of the men in uniform.

A heavy-jowled man with a brigadier's star on his shoulder confronted Sabantoce, said: "Glad to see you made it safely. Are they all in that building now?"

"Every last one," Sabantoce said. He swallowed.

"What about the formula for your Compound 105?"

"Well," Sabantoce said, and allowed a smirk to touch his lips: "I took a little precaution about that —just to keep you honest. I mailed a few copies around to . . ."

"We know about those," the brigadier said. "We've had the mails from this place closed off and censored for months. I mean those copies you typed in the bursar's office."

Sabantoce turned white. "Well, they're . . ."

Latchley interrupted, saying: "Really, what's going on here? I thought we . . ."

"Be quiet!" the brigadier snapped. He returned his attention to Sabantoce. "Well?"

"I . . . ahh . . ."

"Those are the ones we found under the floor of his rooms," said a man by the door. "The typeface is identical, sir."

"But I want to know if he made any other copies," the brigadier said.

It was clear from the expression on Sabantoce's face that he had not. "Well . . . I . . ." he began.

Again, Latchley interrupted. "I see no need to . . ."

The loud cork-popping sound of a silenced revolver cut him off. The noise was repeated.

Latchley and Sabantoce crumpled to the floor, dead before they hit it. The man by the door stepped back, holstering his weapon.

As though punctuating their deaths, the outside night was ripped by an explosion.

Presently, a man leaned into the room, said: "The walls went in the

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way we planned, sir. Thermite and napalm are finishing it. Won't be a trace of those dirty Commies."

"Good work, captain," the brigadier said. "That will be all. Just keep civilians away from the immediate area until we're sure."

"Very good, sir."

The head retreated and the door was closed.

Good man, the brigadier thought. He fingered the lone remaining copy of Compound 105's formula in his pocket. *They were all good men. Hand picked. Have to use a different screening process to pick the men for the next project, though: the investigation of possible military uses in this Compound 105.*

"I want these bodies burned practically to ash," he said, gesturing with a toe at Sabantoce and Latchley. "Deliver them with those you pick up from the building."

From the shadowed rear of the room came a heavy, growling voice: "What'll I tell the senator?"

"Tell him anything you want," the brigadier said. "I'll show him my private report later." And he thought: *There's an immediate use for this compound—we have a senator right in our pockets.*

"Damn' nigger lovers," the growling voice said.

"Speak not unkindly of the dead," said a smooth tenor from the opposite corner of the room.

A man in a black suit pushed himself through to the open area around the bodies, knelt and began praying in a soft, mumbling voice.

"Tell me as soon as that fire's out," the brigadier said. ■

IN TIMES TO COME

Next month Poul Anderson will be back with us. This one—it will be in two parts—is a Van Rijn, "Trader Team." Van Rijn himself is off stage this time. The story concerns the efforts of four intelligent entities working as a team to establish trade rights with a jealous, superstitious and markedly murderous alien race.

The four make a fine team—Brains, Brawn, Beauty and Business. Brains can exceed the speed of light. Brawn can run on this .7g planet 150 k.p.h. (He comes from a 2.3g world.) He is a six-limbed centauroid, reptilian variety. Beauty is feline and tends to have a bad temper. Business, of course, is—busy. Also human—which tends toward complications when there is a lost human colony—the Valkyrie type—on the planet.

The Editor.

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by Christopher Anvil

DUEL TO THE DEATH

To keep your explorers from bringing alien germs home from alien planets they explore, you can use a quarantine system. But some larger—and more intelligent—things might not accept quarantine. So what do you do . . .?

The fight began on the 3rd of March, 2363, Terran Standard Time, at 0822 hours by the chronometer in the cabin of the scout ship *Torch*.

It was at this moment that the tiny bell just behind the left ear of Stellar Scout Anthony Conger began to ring, and it was at this moment that the miniature transmitter atop the helmet of Conger's exploration suit transmitted the ringing of the bell. Before Conger himself was fully aware what was happening, the ship's Log had recorded the sound of the bell, and the exact time of its alarm. The ship's transmitter had relayed the information to a signal satellite overhead. The signal satellite had bounced the warning toward a central collector station waiting to slam this message or any other like it through subspace for immediate relay to HQ on Terra.

Before this process had time to more than begin, Conger felt a brief piercing sensation at the inside of his left knee, just above the top of one of the high sturdy boots that fit closely over the exploration suit's impenetrable skin.

Conger had time for a feeling of surprise, for a recognition that the bell signaled the passage of something through the supposedly impassible wall of the suit, and for the realization that the bell and the brief pain were connected. He was bending to find the cause, the indescribably sharp thorn or seed-pellet that must have pierced the suit, when the sense of fatigue hit him. He continued to bend, and when he hit the ground he hit it like a sack of mash that tilts and falls from the back of a colonist's truck.

Where Conger lay on the ground, some forty yards from his scout ship, he was among a low spreading mosslike growth that looked

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like a miniature forest, and he, with his suit, had by contrast the appearance of a gigantic mechanism that had abruptly been turned off, and now lay motionless. If there had been small creatures in the forest, they might have explored Conger, marveling at the size and complexity of his huge alien mechanism. They might have explored Conger, that is, if they could have penetrated the carefully-designed suit.

Inside the suit, Conger lay motionless. But the suit was wide awake. The suit noted, and transmitted data on, the extreme shallowness of Conger's breathing, the drop in his body temperature, the slowing of his pulse, the varying pattern of his brain waves, the alteration in his skin-resistance. The ringing of the alarm bell cut off as four little dots, parts of a pattern of dots that covered the inner surface of one of the thin layers of the suit, heated and flowed in a molasses-like stream that spread a layer of sticky fibers over the tiny hole at the back of the left knee of the suit. A tiny, microminiaturized receptor traveled spiderlike down the inside of the suit's left leg, paused at the knee, and swept its electronic gaze across the smooth tight inner suit Conger wore, and that at one point held a little droplet of clear blood. The tiny receptor sent back a very slightly fuzzy three-dimensional image of this blood droplet. After that, the suit maintained its even temperature, held the concentration of oxygen, carbon dioxide, and nitrogen at the proper levels, and reported continuously the respiration, pulse, blood pressure, and other indicators of Conger's condition. And the suit held itself in readiness to report and seal any new penetration of its tough layers. But beyond that, there was nothing more it could do, so it waited.

Outside, the messages sped toward the collector station, reached it, and were hurled in a tight beam through subspace to the relay that would send them on to HQ. At the relay, a phenomenon known as "fringe radiation" sent a faint bubble of garbled transmission expanding through space from the relay at the speed of light. If anyone out there had been interested, he might have unraveled this garbled transmission, and guessed at the sudden rise in human activity caused by a minute droplet of blood many light-years away.

All this took place outside the tough barrier of the suit designed to seal Conger from all physical contact with the planet he was exploring. Inside the tough but imperfect barrier of the exploration suit, and with due allowance for scale, equally great activity was taking place. The suit recorded what it could of this activity by the crude monitors of blood pressure, pulse, temperature, rate of respiration. But the suit lacked the means to detect the migration of white blood cells toward a point several inches

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Illustrated by Robert Swanson

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above the droplet of blood that was the only visible evidence of what on a larger scale would have been called an invasion. The suit could not see this. It could not detect the rapid increase in the death rate of the polymorphonuclear cells and the monocytes that now congregated several inches below the left hip-joint. The suit lacked the means to infer, from the form of the brain waves, the minute changes that took place in the controlling centers of the unconscious man's brain. There were only the outer gross manifestations to suggest the changes in nerve currents, the shifts in electric potential, the violent activity at lymph nodes, the alterations in blood sugar and oxygen levels; the presence of foreign substances that entered the blood stream, were swept to the heart, the lungs, back to the heart and on to reach the brain.

The suit could detect none of this. But it could detect the sudden start as Conger became conscious, as the ancient mechanism that defended the body called, in its need, for help from the conscious entity that occupied the body, and made the need unmistakably clear.

The suit recorded the abrupt alteration in brain waves, galvanic skin response, pulse, respiration, and blood pressure. It could sense, for a brief moment, that Stellar Scout Anthony Conger was wide awake, apparently aware of his mission, aware of the alarm that had rung in his left ear, conscious of the need to correctly perform his duty. Then the gross indicators by which the suit judged altered wildly, and the suit had no way to know Conger, suddenly aware of his body's need, had thrown off all thought of the duties and ideologies imposed on him from without. The suit could only detect the moment of abrupt stillness, the indrawn breath, the sudden rush to an upright sitting position. The suit recorded the scream, dutifully obeyed the commands of Conger's muscles, multiplied the power of his sudden spring from the yielding forest of moss on which he lay, countermanded the attempt of his right hand to rip away the confining suit at his throat, countermanded his attempts to tear off the helmet, obediently multiplied the power of each wild movement that involved no injury to the man or the suit, recorded the desperate plea that burst from his lips, transmitted this one word, "God," to the ship that rested some forty yards away, detected but could not interpret the sudden steadiness that followed the frenzy, recorded the look of determination that passed over Conger's face, recorded the shift in all outward indicators, and the sudden faltering of the pulse.

The single word, "God," was transmitted to the signal satellite, and flashed through space to the collector, as Conger lay motionless.

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Meanwhile, the suit detected anomolies, but did not know how to interpret them. Conger lay unmoving. Within his body, the war was over, but the battle continued, just as isolated combat units will fight on, unaware that on a higher level the cause has been lost. A last message traveled out over the complex network leading from the control centers of the brain. The message traveled along many chains of nerve-cells, from axon to synapse to dendrite, and should eventually have reached all over the body. But at different points along the chains of neurons, the message was blocked between axon and dendrite, and there it ended. The heart continued to pump feebly, stopped, and then under the influence of chemical stimulation began to pump again. The violent resistance of neutrophils and monocytes continued in the abdomen, then in the region of the chest, reinforced by local cells that spat strange molecules at the alien host, that interlocked and clung to it, and then the fight continued along a lymph channel, entered a new and vicious interlude at a lymph node, continued more slowly, moving now along the throat of the motionless body, to pass under the angle of the jaw, the change in skin coloration noted by a watching receptor in the suit, and duly recorded, transmitted, and relayed on a tight beam toward Terra.

And then, after a further interval of quiet, the body moved.

The suit duly recorded the fact.

The eyes opened, and shut.

The hands clenched and flexed.

The lungs drew in a sudden deep breath.

Pulse and respiration returned to normal.

The body stretched.

The eyes opened once more, and came to a focus.

They regarded a tiny receptor poised just above the chin, clinging to the inside of the suit.

An arm of the body hesitantly pulled free of the encumbering arm of the suit, and reached across the chest toward the receptor. The receptor entered a small niche at the edge of the transparent faceplate. The hand tested the strength of the niche, then returned to the arm of the suit.

The eyes closed.

The word "God" arrived at the end of tight-beam transmission through subspace, reached the relay, and was transmitted toward HQ, simultaneously with the faint globular echo that sent it expanding at the speed of light through the universe.

And at that moment, there were two nearly simultaneous transmissions, as viewed from a point halfway along the transmission-line linking Conger's body and human HQ on the home planet.

From the human end of the line came the single order, "Jettison."

From the other end, from Conger's motionless body, came a trans-

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mission the suit could not detect or record, and that was outwardly signaled only by a slight reflexive narrowing of the eyes that the suit duly picked up. But the subject of the message passed, it could not detect.

This message, in the form of impulses on a totally different wave length from that usually used for direct human communication, brought a prompt answer, and transmission and reply flowed rapidly, imbued with a sense of urgency:

"I have the control centers. Not much damage to the host. But this organism isn't fully centralized. There is still resistance."

"You will overcome it. What caused the delay?"

"The organism has a separate exoskeleton. Passing it was exquisitely painful, and even then, the controlling organism was completely separate, covered by another exoskeleton."

"But you are now in control?"

"Yes. But there is resistance."

"What else is it that troubles you? You haven't told us everything. There is something else wrong. What is it?"

"The exoskeleton is occupied by other small organisms. What I have may not be the ultimate control after all."

"You have the information banks?"

"Yes."

"Suspend the vegetative functions and scan."

The suit now recorded, and transmitted, the fall in rate of respiration, the slowing of heartbeat, and other gross indications. Again, later, it failed to detect the resumption of a different form of transmission:

"Yes. We have it. Resume the vegetative functions."

"What is it? What does all that mean?"

"As nearly as we can tell, it means you have a find equal to the greatest ever made in our whole history. We also judge that you are in serious danger. The ultimate control mechanism is located outside the exoskeleton, completely out of our reach on another planet. The exoskeleton is partially subject to external control."

"It hasn't resisted in any way since initial entry."

"There is a time-lag, similar to that of impulses passed over a nerve. Your only hope of safety is to leave the exoskeleton."

"In scanning, I saw that this may be fatal to the organism."

"There is no time to explain. Merge your consciousness with ours and let us control the organism."

The suit now recorded a rapid increase in oxygen-consumption, not accounted for by any violent physical activity, and followed by the withdrawal of both arms into the suit. A moment later, both arms struck violently at the large clear headplate, distorting the tough plastic, but not breaking it. Another vi-

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olent thrust produced a similar bulge, but the plate did not break. A third attempt failed to cause more than a minor distortion.

The one-word order from human HQ, "Jettison," now reached the end of subspace transmission, left the collector, and flashed toward the communication satellite.

The suit, recording a further increase in oxygen consumption, missed the messages that passed back and forth in mounting desperation:

"Can't get out that way. You will have to return the organism to its vehicle, and follow the customary procedure."

"But you said yourselves . . . *What if the destruction order is already on its way?*"

"There's no help for it. We'll just have to move fast. Get out of the way, and give us control."

"No. This is the only way. I sense it."

"Give us control! There's no time to argue!"

"These limbs aren't even strained. That was no maximum effort. There are safety devices. . . ."

"Give us control!"

The suit recorded a sudden cessation of breath.

The single word "Jettison" reached the communications satellite, flashed to the scout ship, triggered a special circuit—

Simultaneously, the suit's receptors signaled the sudden bursting of the headplate, the unseating of gaskets that sealed the oversize helmet to the body of the suit, and the violent thrust that brought the suit's occupant almost out through the wide neck of the suit.

The special circuit in the ship some forty yards away flashed a message to the suit, and following that, a different message to another part of the ship.

There was a bright flash at the midsection of the suit, and a blast of flame from the mouth of the suit.

The ship quivered, a puff of smoke escaped at the edges of the closed hatch, and a flash of flame showed at a small window, to be followed by a dull roiling visible within, and many spreading cracks in the window itself.

The ship transmitted a last scene of the shattered burned remnant that had been Stellar Scout Anthony Conger.

That message, followed by electromagnetic silence, tailed out of the communications satellite, reached the accumulator, streaked through subspace to the relay, ballooned out faint and shadowlike in all directions as an expanding sphere, and simultaneously hurtled into the communications network that quickly cast it in clear visual three-dimensional form on a screen at Luna I HQ.

A tall, strongly-built man, with three comets at his lapel, watched the screen closely, then turned to a shorter man with one comet at his

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lapel, who in response made brisk rubbing motions with his hands and said, "That ends *that*."

The taller man glanced around the little group of pale, grinning, slightly sick technicians and lesser officers, and when he spoke, his voice grated.

"Play that over."

"Sir?"

"Play that over. I want to see it again."

As the technicians turned to obey, the shorter of the two men, with one comet at his lapel, gave a slight nudge and said to the other, "General Matthews has a cast-iron stomach. That's how the high command is selected." He glanced at Matthews, and there was no response. The superior of the two generals was studying the chaos on the screen. When it was over, he said:

"Play it again."

One of the technicians bolted from the room.

The others bent numbly to their jobs, avoiding the sight.

When it was over, for the third time, Matthews said, "Take the end of that, the last few seconds, and make it up into blown-up stills. And I'll want representative stills of the rest of the incident. From beginning to end."

As the technicians and lesser officers of the headquarters communications center obediently bent to their tasks, the shorter man with one comet at his lapel turned to study Matthews with a look of puzzlement.

"Hell's bells, the thing's dead."

Matthews turned away and said as he walked off, "Come into my office for a minute."

As if drawn despite himself, the other man followed.

Matthews sat down at a large desk, and slid across a box of cigars.

"Help yourself, Cutter," he said, with no particular inflection in his voice.

"Thanks," said Cutter, He glanced at Matthews uneasily. "Say, Brad, I'm sorry if I spoke out of turn out there. I know you've got the rank, and all you've got to do is snap your fingers and I'll spend the rest of my service life okaying requisitions for brass polish."

Matthews' face strained in the effort to produce a smile, failed completely, and the resulting distorting chilled Cutter as no reprimand could have done.

"Sir," said Cutter, "I'm very sorry. Please accept my apologies for the . . . the undue familiarity."

"Yes," said Matthews, puzzled by this sudden shift of attitude.

"We get . . . well . . . pretty free and easy and informal out there on the frontier, sir."

"Perfectly all right," said Matthews. "I understand." He made another attempt at a smile, as his awareness of the situation told him that only a smile would relieve it. Matthews did not really feel like

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smiling, but he was accustomed to supply lack of feeling with conscious effort, and he supplied it now, liftng the corners of his mouth consciously in imitation of a warm friendly smile.

Cutter wilted in his chair, all the easy assurance and camaraderie of frontier life burned away in a realization of just how fatally he had angered his superior officer. Matthews' grimace told him plainly what volumes of words could never have expressed.

Matthews, seeing Cutter sink back visibly, took this as a sign of relaxation, and settled back himself, pleased that he had been able to establish a proper atmosphere for what he had to say.

He cleared his throat. "You know, Cutter, this is a serious business. We have taken a great many precautions to protect our colonies from infiltration by unknown life forms. We did this, first, purely on a theoretical basis. But three times recently, on three separate worlds, we have run into this very phenomenon you've had a chance to see first-hand today. You appreciate that it's a serious business if our opponent, whatever it is, succeeds?"

"Yes, sir," said Cutter dully.

"You see," said Matthews, "the first time this happened, it was the cause for a mild alertness on the part of the watch team. The breaching of the exploration suit merely meant that our man on the planet might find himself in trouble from poison or some exotic disease germs. So we didn't stop it quite as fast as we did today."

Cutter, despite himself, said, "What happened, sir?"

"The scout," said Matthews, "gradually changed form. I don't know how to get this across without sounding melodramatic. Before our eyes, we had a demonstration of physiological control. Bodily proportions changed, as if whatever it was that had gained control was putting its new captive through its paces. Testing the flexibility of the protoplasm. Then it reverted to the original form."

"What did it do then?"

"It started to get out of the exploration suit. We destroyed it."

Cutter hesitated. "Sir, what of the next time it happened?"

"The next time was just about the way it was today. We observed signs of a physiological struggle that just about matched what we had recorded from the first instance. We destroyed the suit, and the scout, and the scout ship."

"The three planets where this happened are close together?"

"Relatively speaking. The first two happened to be planets of stars in the outstretched upper limb of the constellation, Felis Major. The third star is roughly in line with the first two. They are all, roughly, in the same region of space. All three planets are Class A, with breathable atmosphere, perfectly suitable for colonization. Except for this."

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The two men sat silent a moment. Cutter said, "Haven't I read . . . Isn't there some literature about this very thing?"

Matthews nodded. "The records aren't complete, but there's enough to give a good idea. The old magazines of technological speculation have reference to just such a situation. And we have most of a complete volume on this exact problem."

There was a thud and the soft tone of a gong, and Matthews lifted the cover of a low cabinet built into the wall to the right of his desk. He took out a stack of glossy ten by twelve photographs, in full and grisly color, riffled through them slowly, and tossed one across to Cutter.

"There's our problem."

Cutter looked at the photo, turned it around, and looked up in puzzlement.

Matthews said, "The head, shoulders, and upper body are all in one piece. The head isn't even seriously burned. I doubt that the heart and lungs have been put out of action."

Cutter started to speak, paused, then nodded slowly. He moistened his lips. "It's hard to appreciate that damage like this might not be fatal."

"But that's what we're up against," said Matthews.

The creature was no longer in pain, having blocked the synapses of all but a few of the nerves leading in from the badly damaged surface of the body. Now, for the first time, it could spare the attention to answer the call that was repeating over and over again an urgent demand for information.

"It's all right. Nothing serious was damaged. But this body has a capacity for pain unlike anything I've experienced before."

"We thought you had been destroyed."

"The upper region of the body has only superficial damage. The lower region is in bad shape. There isn't much I can salvage. I'll have to discard most of it to avoid poisoning by the decomposition products."

"Can you handle it alone?"

"Not very well. I'm still under attack by the roving nucleated cells that infest this body. I'm hoping that the tissue damage will draw them to the surface so I can have freedom of movement in the interior."

"Stay at the control centers. We'll send help."

Cutter handed the photograph back to Matthews.

"What can we do to make sure it's dead?"

"Destroy the planet."

Cutter shook his head. "Sir," he said earnestly, "a whole planet? I don't want to seem chicken-livered, but couldn't we merely find the remains of the scout ship and blast everything within a hundred-mile radius of it?"

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Matthews snapped a desk switch and studied a three-dimensional stellar chart to one side of his desk. Scattered sparsely among the stars were pale blue spheres. Matthews shone a pointer of light that touched one of the spheres.

"This is our nearest base." He moved the pointer further out. "About here we will have our roving patrols. From here on out to the trouble spot will take at least twenty days, and that's assuming we're fortunate."

"Sir, how far could a man in that condition go in twenty days?"

Matthews, frowning, studied the chart. He looked back at the photographs.

Cutter said earnestly, "Sir, some day we'll learn how to kill these creatures just as we kill ordinary germs. But will we ever learn to put a planet back together? I've been out on the frontier, and, sir, I know how badly we need every Class A planet we can get."

Matthews, his eyes narrowed, studied the photograph, looked up, and cleared his throat.

The creature was more comfortable now, free of the strain of singlehanded effort it had felt before.

"Better?" said the voice.

"Much better. I think we have everything under control now. It's much easier with a team."

"As soon as you can, we want you to strengthen the musculature of the host's chest and forelimbs. We are going to move you, and you will have to help."

"No, not yet. The resources of this body are stretched almost to the limit. Before we can accomplish anything else, we have to regenerate the lower portions of the assimilative tract. And there are a number of organs we have to regenerate as soon as possible. For lack of their internal secretions there is an overall loss of tone and an accumulating imbalance that is going to make a great deal of trouble later on."

"There won't be any later on unless we act promptly now. The data we've received from the host's information banks shows that great precautions have been taken by this race's ultimate controlling mechanism to prevent loss of control of even a single of its units. Everything that has happened thus far is known to this controlling mechanism. The control mechanism must know that the initial attempt to destroy this unit failed. Its reactions in that first attempt were fast and decisive. Can we expect anything less now?"

There was a moment's hesitation, then the reluctant reply.

"You're right. I'll take care of it at once."

Matthews turned the photograph over, and shook his head.

"In twenty days, we don't know what will happen out there. The only way to destroy the creature,

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and *know* that we've destroyed it, is to destroy the whole planet."

"Sir, a man in that condition won't go anywhere in a hurry. Even assuming the most fantastically rapid healing, there are bound to be natural obstacles to travel. We *can't* destroy the whole planet merely for the purpose of getting certainty to the last decimal place."

Matthews' eyes glinted. "What would you do?"

"Blast the site and everything for a hundred miles around, *after* getting complete pictures of the whole region from overhead. If the ship, and the remains of the suit and body were still there, I'd call it a day. If the body was gone, I'd roast everything within a fifteen-hundred mile radius. I'd make sure that the ship and the suit were completely destroyed. Pulverized. Burned to dust and the dust scattered. Then I'd ring the planet with satellite planet-busters, and if anything came up off it, *then* I'd destroy the planet, and with it the thing that was on its way up. And, sir, I'd think I had assurance triply sure, compounded, and cubed. *And* we'd still have the planet for use later on."

Matthews stroked his chin.

Cutter said, "Sir, we *need* planets."

Matthews nodded. "All right. There's a fleet being formed off Sental II for the purpose of dealing with all of these planets. I would have said. 'Destroy the lot of them.' Perhaps your way is better. There seems to be very little risk."

"Sir, so far as I can see, there's *no* risk."

"There is, because we're dealing with the unknown. You don't lay down rules to govern the unknown. You only try to confine it within certain borders. You do this by controlling certain elements the unknown has in common with familiar things."

Cutter nodded. "Yes, sir. In this case, the unknown being material, and thus subject to the law of gravitation, this whatever-it-is can't get off the planet without some means of transportation. And can't move body, suit, or ship without showing it."

"Yes," said Matthews. "So it seems. But I am going to modify your plan to be on the safe side. If, on any of these planets, you find the body or its remnants are not there, you will destroy the entire planet."

Cutter drew a deep breath. "Yes, sir."

"Sental II," said Matthews, "is on a short direct subspace route from here. You can be there by the time the fleet is formed and ready. From there out, it's all problematical. You shouldn't hit any impassable radiation barrier in that direction, but all we know about the region comes from the reports of scouts. Who approached it from a different direction."

"I'm sure we can make it with no

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trouble, sir. We only hit serious radiation barriers when we try to go outward, toward the rim of the galaxy, or if we go too far laterally. The barriers ease out, like the walls of a funnel, as we move in toward the center. This region is almost directly inward."

Matthews nodded. "I'll wish you good luck, in any case. Your orders will be ready shortly. If, while you're here, there's any message you want to send down to anyone on Earth—"

Cutter grinned. "There is. I'd like a solido hookup."

"Easy to arrange." Matthews picked up one of the several phones. A few moments later Cutter shook hands, saluted, and left the room.

Matthews put the grim stack of ten by twelve color photos back in the wall cabinet by his desk, hit a button marked "microfilm," and another marked "file," and sat down again at his desk.

There was a thud and a click from the cabinet, then the office was quiet. Matthews put his hands to his temples, frowning.

He had a headache, and a faint, sick, queasy feeling.

He looked around the room depressed at the regulation gray he had seen hundreds of times before, with no reaction.

Something was wrong, he told himself.

But what?

The thing was sick.

Clinging to the centers of control, holding itself in phase against the growing fatigue, it slammed the nerve impulses down the long tracts, conscious of their inevitable decay and automatic amplification by the built-in mechanisms of the captured body. But the resistance was rising steadily. It grew progressively harder to create the necessary tension to initiate the electrochemical process that ended in holding the burned hands clenched and the large muscles of the arms tightened. The chemical stocks of the body were badly depleted, and poisons were accumulating. Strong talons clamped the sides of the body from outside in a viselike grip that interfered with respiration, and yet was not enough in itself to give full support or allow a moment's rest. From some uncaptured stronghold in the labyrinth of interconnected neurons that was the creature's brain came the faint but insistent hypnotically regular command ordering the dissolution of the body's cells, and this command must be blocked while the need to override the fatigue of the efferent nerve channels rose to a level that required every bit of conscious attention merely to maintain the grip of weakening muscles. And now, somehow, one of the large nucleated free-moving cells found its way into this hidden place, and with a detectable sensation like a growl of content forthwith set about its grisly work of dismemberment.

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There was nothing to do now but scream for help, and with every impulse hurled along fast-clogging nerve-channels, the scream went out. Each time it was a little weaker.

"It's all right," came the answer. "You're almost there. Just a little longer. Hang on. We'll have help to you in a moment."

Brigadier General Cutter had never felt better. He had his memory of Dione's arms around his neck, and when he thought about it he could feel her lips tight against his, and her tantalizing perfume rising to his nostrils and almost drowning him in its mere memory. He had, in addition, a fully independent command, and a mission that could not have been at the same time more simple or more ominously important. Perform it successfully, as no one with all his wits could fail to do, and he would have commendation, promotion, and a certain ineradicable increase in professional stature. Let the news leak out that he had blocked an order to *destroy* three Class A planets, and he would have political backing all along the frontier. To add to this perfection, he had the ultimate in good fortune, a fleet navigator who had struck a lucky subspace route that knocked six days off the original estimate, making it so much the more likely that he could let this first planet off with a minimal dose. That would look better yet to every frontier colonist who learned of it. And all this, in turn, compounded his original source of ecstasy. Could Dione, already weakening to the pleas of a mere brigadier general, withstand the demands of a major general with the luster of glory on his name and with the whole body of border senators in his pocket? No, the prospective major-general told himself, she could not. His ambition, growing cramped in the constricted bottleneck below the ultimate top levels of command, revived with a rush. The star-flecked dreams of youth returned, and he saw himself with hand upraised, in solitary splendor. The words of the oath of the highest office open to any human in the known universe echoed in his ears, and through his veins there flowed like wine the intoxication of power.

The creature was conscious of misery, despair, and a situation inside the captured body that bordered on chaos. He was out of phase with the final elements of the body's control centers, but he had still a vague remembered awareness of up-and-down motion, and of the voice soothing him:

". . . Almost made it. Close enough. All that has to be done now is to draw the body through a short stretch of water and up onto the land. We can do that without your help. Once on land, you'll be all right, and we've arranged for you to get a good deal more help. All

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we should lose in the process is the transporter. That's going irreversible already, but we should be able to get everyone out. . . . There. . . . You're on land. Safe."

And that was all he was conscious of for a long long time.

When at last he felt the first flicker of awakening consciousness, the situation was far different. At first, he found that he was unable to orient himself, and he experienced a moment of panic before he discovered that the control centers of the captured host organism had slightly changed phase. A first cautious contact gave him an entirely different body-sense than what he had expected. Cautiously, he tried again.

This time, he realized what had happened. The sensations of pain that he was trying to damp down were no longer coming through. In their place was an awareness of physical good order. He opened the visual receptors of the organism.

Abruptly he realized that he was sitting on a beach, looking at long flat waves rush up the sand. He had a sense of well-being, aliveness, and awareness, that brought him to his feet on a rush. Unthinking, he sprinted down the beach, whirled, paused, and closed his eyes.

With an effort, he shifted himself slightly out of phase, put the organism in a sitting position, and considered what had just happened.

The voice reached him, amused: "What do you think?"

"This is the best yet. It responds beautifully." There was a moment of astonishment. "The lower limbs have been regenerated!"

"The entire organism has been gone over. We've done a lot of work, believe me. There are parts of the organism that apparently never were properly developed. There were organs partially clogged with poisons, evidences of mistreatment and malnutrition, energy directed along the wrong nerve tracts, habitual enforcement of incorrect or distorted functions. You have to remember that this organism was just a cell in a much larger group organism, and when the functions of that larger organism demanded it, this comparatively small cell was grossly distorted to fit the larger functions. Without that pressure, we've been able to put it into better condition than it's ever been in before."

"It must have taken a great many of us to do this."

"Yes, at first. But most of the work was self-maintaining once we had it properly started. You should have no trouble managing it all yourself, except for one thing."

"What's that?"

"The roving nucleated cells. We've had a great deal of irritating interference from them."

"Could we wipe them out?"

"Probably. But they serve a useful function in keeping down other troublesome organisms. They're not really dangerous to us unless we're

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in weak condition, or have to stay still in some exposed location. We'll have to try to exist with them, until we can find some better way."

"In that case, I don't want to run this organism alone."

"You won't have to, for now. You'll only have to do that if you should have to give up your companions in taking over other organisms."

That was the last the voice had to say for the moment, and he found himself speculating on it. Everything habitable on the planet was already occupied by his kind. What other organisms were there to take over?"

Brigadier General Cutter studied the stiff summaries, looking for the words he wanted to find. The scout ship was "definitely located." That was good. The suit was "apparently located." That was understandable, considering the violent explosion that had partially ripped the suit apart. Good enough, anyway. But the body of the stellar scout was "uncertainly located, possibly owing to complex biological degenerative changes."

What the devil did *that* mean?

Cutter picked up a phone. "Rodner?"

"Sir?"

"What's this on the body? Is it found, or isn't it?"

"We're not certain about that, sir."

"Why?"

"Well, sir, there's been a good deal of violence down there. And, of course, exposure. It's an alien planet. We don't know just what the decay bacteria on the planet can do."

Cutter scowled at the phone.

"I gathered that much from your report."

"Yes, sir."

"Well?"

"Sir?"

"So what?" said Cutter angrily. "What about the exposure and decay? What about the bacteria?"

"That's precisely it, sir. We don't know."

"Don't know *what?*"

"Their effects, sir."

"So?"

The voice was cool. "Well, of course, therefore we just can't say."

Cutter held the phone out and looked at it. He put it back to his head and said, "Are you working on anything right now that can't wait?"

"N-No, sir."

"Then come to my office and we'll talk this thing over."

Cutter jammed the phone back in its cradle, and growled under his breath.

The door opened and a tall, slender, rather sensitive-looking staff officer stepped in. Cutter pinned him with his gaze.

"Now, then, what's this about the bacteria and all the rest of it?"

"Sir? Just what I told you."

"Tell it again."

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The officer said patiently, "Owing to the time-lag prior to examination and to the uncertain effects of bacterial action on this planet, we find it impossible to state definitely whether or not the remains we have located are truly the remains of the stellar scout, Anthony Conger."

Cutter smiled and nodded his head. "Very good. Now, Rodner, let's just look over that statement. And before we do that, let's consider, if you don't mind, a few other aspects of this. Shall we? First of all, you have, if I remember correctly, a splendid record in your specialty, and it was this that gained you a temporary commission as major when you were inducted. This is correct, is it not, Rodner?"

The staff officer, watching him with an incredulous look, stammered, "Yes. Yes, that's true, I believe."

"Well, well," Cutter stood up, beaming paternally. "*Major* Rodner. It sounds nice, doesn't it? Much better than, say Pvt. Rodner, or Pfc Rodner, or, maybe, T/3 Rodner. Doesn't it?"

The hapless staff officer opened his mouth, shut it, and swallowed. As if despite himself, his mouth opened up again. "Yes, sir."

"Good," said Cutter. The paternal look vanished. "The trouble with temporary rank is, you can lose it anytime. You need to make your superiors happy if you want to keep it. I will now ask you a question: *What do you know about the condition of the stellar scout's body down on that planet?"*

"Sir," said the staff officer desperately, "we have located several sizable masses of proto . . . that is, body tissue—"

"I know what protoplasm is," the general grated.

"We've found several sizable masses of protoplasm, and have definitely identified badly burned human body tissue in some of these masses. These tissue samples are apparently from the lower parts of the body. The remains of the upper part of the body is more thoroughly decomposed—"

"That's natural, isn't it? Wouldn't the charring of the lower parts of the body slow down decay?"

"Yes, sir."

"And the upper part of the body, being exposed to the elements, and there being nothing whatever to slow down decay—that *would* be more likely to be affected by the local decay bacteria, wouldn't it?"

"Yes, sir."

"And that would account for unusual chemical substances in the body, wouldn't it?"

"Yes, sir. To a degree."

"Then what's the problem? And you'd better give me a straight answer."

"There are decay products that couldn't have been derived from normal body chemicals. There is hair that appears to be materially

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unaffected by exposure, and yet its chemical structure does not correspond to that of human hair. Photographs of the body show, from the purely physical standpoint of appearance, a perfectly normal picture, considering the circumstances. Chemical analysis shows some things normal, and some things abnormal. We're handicapped in working out a definite answer because we can't work on the body at close range. We have to use servo-dissectors and analyzers, and a variety of remote-control techniques that become awkward when the situation is so far from routine."

Cutter scowled. "And the net result is that the outward appearance of the body is all right, but the chemical structure is wrong?"

"Well, not entirely wrong. But—"

"Ninety per cent wrong?"

"Oh, no, sir."

"Fifty per cent?"

"If you mean, are fifty per cent of the compounds of the body, and of the decay products, wrong. No, sir. Not that many."

"How many?"

"I would say . . . oh . . . two per cent, roughly."

"Well, then . . . two per cent. That isn't much. After all, we're dealing with a strange planet."

"Yes, sir." The staff officer's face showed signs of a struggle for words. "But this two per cent happens to be next to impossible for us to explain on any rational basis."

"Obviously. You don't know everything about the planet."

"We can allow for wide differences in some directions, but not others. For instance, we recognize a human face as human despite variations in height of brow, prominence of cheekbones, width of skull, spacing of eyes, size of nostrils, skin, eyes, and hair color, freckling, beard growth—there can be wide variations in these things, and they aren't critical. We know we're dealing with genuine human characteristics, and there's no special effect of dealing with anything alien."

Cutter nodded. "Well, then—What's the difficulty?"

"Well—Suppose someone walks in with everything perfectly normal except he has a growth of beard across the forehead, and his nose on upside down? Then what?"

Cutter's heart seemed to skip a beat. "You didn't mention—"

The staff officer looked as if he felt sorry for Cutter. "Sir, that's just a comparison. The anomaly is on the chemical level. But, believe me, it's just that bad."

Cutter nodded. "All right. You've given me a straight explanation. That's what I want. Now get out."

The major hesitated, then saluted hurriedly, and went out.

Cutter blew out his breath. Matthew's words echoed in his ears:. "If, on any of these planets, you find the body or its remnants are not there, you will destroy the entire planet."

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That was an order. It was recorded on tape in Matthews' files, and a copy of the tape had been forwarded to Cutter for his own files, and clipped to the packet containing his written orders.

Whether or not he, Cutter, should destroy this planet depended on how literally he interpreted his orders, and on a purely technical guess as to whether the body was or was not there. And he was not personally qualified to make the guess.

Cutter's gaze fell on his desk solido of Dione. As he watched, she seemed to smile up at him, arms stretched out.

With an effort, Cutter picked up the staff summary, glanced from it to the solido, and wavered.

The powers of the captured body, once relieved of accumulations of poisons and self-defeating nerve-currents, were intriguing. He slowed the body, stopped, whirled, and glanced back at the ground he'd covered in a brief spurt. Not bad. He glanced up, crouched, sprang, caught the limb of a low weathered tree, and hauled himself swiftly up into the knobby branches.

The voice spoke in his head. "A remarkably versatile organism. But hadn't you better go slow at first?"

"No need. The control-information for every single move I've made is coded and stored away in one section or another of the creature's brain. All I do is just let it take over. Watch."

He glanced around.

The tree grew at the edge of a deep rocky inlet. Briefly, he studied the clear water, then arced out from the tree, split the water cleanly, and popped to the surface, aware of a grin that expressed his sense of well-being perfectly.

The voice was reproving. "If you'd gone just a little bit to one side, you'd have split the creature's skull."

"The point is, I didn't go that little bit to one side. The control mechanisms are extremely accurate, once freed of the cumulative poisons and allowed to function properly. I think basically this is a much more finely-controlled organism than any of our others. The beauty of it is, most of the control is automatic. I don't always know just what the mechanism will do, but I have a sense of *readiness*. For instance, when I looked out of the tree at the water, if I looked beyond the rock, I had a feeling of unease and danger. Thus I knew the body could not clear the rock. When I looked at the water in front of the rock, again I had the feeling —this time more a sense of cramping. A little analysis showed that the body would either strike the bottom, because of too steep a dive, or strike the rock, because of too shallow a dive, and hence too much forward motion. There was no way to avoid one of these difficulties

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without running into the other. When I looked to the side, however, there was a feeling of perfect ease and readiness. There was really no need to calculate anything. It was all done by a process of comparison with stored data."

"Then you are ready to test the body against our others?"

"I'm ready, of course. But I don't think there'll be much I need to do except to keep the internal processes and the functioning mechanism of the body in proper condition, and perhaps occasionally make a selection between alternatives. It's operation seems to be largely automatic."

"In that case, we might as well start. We hope to have some more specimens before too long, for comparison."

"How so?"

"Several remote-controlled vehicles have come down to examine the remains of the exoskeleton and the host's body. Of course, we've heavily infiltrated the vehicles, in the samples of decomposing body tissue. Thanks to the information we have from previously scanning your host's brain, we've been able to locate the circuits which control the vehicles. They really aren't so much different from nerve circuits, basically."

"What are you going to do?"

"Corrode and wear away a section of a separate circuit designed to trigger an explosion to destroy the vehicles. This is nearly done. Then, when they can't strike back at us by destroying the vehicles, we'll take over the vehicles. They are driven by mechanisms controlled by small motors, and these are controlled in turn by plungers actuated by"—there was a minute pause—"solenoids. Movement of the six sets of plungers determines the eventual movement of the vehicles. The solenoids are small, and the plungers light. All we need do is cut the normal control circuit, and actuate the plungers mechanically."

"That will warn them."

"Of course. We will do this only if they send the signal to destroy the remote-control vehicles. But they have vacillated for some time. The vehicles were ridiculously easy to infiltrate. The sham body we constructed was so closely accurate we doubt they can detect the difference. If they do attempt to destroy the vehicles, we will simply send them up at the larger vehicles off-planet and try to manage just one collision. All we need is to get just one of us inside any one of those ships. And now, if you are ready for the test—"

"I'm ready."

Brigadier General Cutter strode back across the room, and slammed the staff summary onto the floor in the corner. No matter how he approached the problem, it changed form before his eyes, and the solution he had just arrived at seemed wrong.

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The simple, obvious, solution was to say, "Destroy the planet." For justification, he could point to his orders, and to the indecisive staff report. But that was just the trouble. The staff report *was* indecisive. Angrily, Cutter turned to the photographs of the body. Certainly, that hideous shambles *looked* authentic. He glanced at the detailed dissection and analysis report. The dissection reports disclosed everything normal, considering the circumstances. Only the chemical structure seemed anomalous, and those anomalies were few and small. It took a specific type of biochemical training to begin to appreciate them.

Cutter shook his head. On the strength of these few submicroscopic differences, he was supposed to destroy the planet. And if he *did* destroy the planet, it would, inevitably, raise an outcry along the whole frontier. Inevitably, there would be an investigation. And this was the evidence he would have to present to justify his case for destroying the planet. He could see himself in the packed Senate chamber, a microphone shoved up to his mouth, a tri-di camera staring him in the face, the question put to him gently, but inescapably:

"And you say, general, your orders were to destroy the planet, if the scout's body was not there?"

"Yes, sir."

"Now, general, I ask you to look at this photograph. Have you seen this photograph before?"

"Yes, sir. Of course I have."

"May I ask you, what is this a photograph *of?*"

And there he was. Hung up. What could he say? He could answer the question in different ways:

"Senator, that is the body of the stellar scout."

"Now, general, this photograph was taken on the planet you destroyed, was it not? It was taken just before you issued your famous command to destroy the whole planet, was it not?"

"Yes, sir."

"And your orders were to destroy the planet *if the body of the stellar scout was not there?*"

"Yes, sir."

"And yet you just said, *this is a photograph of that body!* Then the body *was there,* was it not? You don't argue, do you, that you took a photograph of something that wasn't there?"

And he was condemned out of his own mouth. On the other hand, he could answer differently. He could say:

"Senator, that is an *imitation* body, constructed by an alien organism."

"It is—what? What was that again?"

"That is not the body of the stellar scout. That is an imitation body constructed to mislead us."

"It is? Why, general, it's a badly decomposed body, but it looks human to me. Here, show me anything here that's nonhuman. Does

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it have six or seven fingers? I don't see anything. Show me."

"It isn't a question of appearance, senator. Obviously, a sham would be ineffective if the appearance were inaccurate. It is a question of the chemical structure of the body."

"General, when I look at you to see if you're human, I don't have to cut you up and run samples of you through a test tube, do I?"

Laughter in the chambers.

"No, senator, but if you found my body, ran it through a test tube, and discovered it was made of green cheese, you'd be a little suspicious, wouldn't you?"

"Well—That's a point, I have to admit, general. But I have here this sheaf of papers showing the results of anatomical and chemical examination. The anatomical examination showed perfect normality."

"The body was in a state of considerable decomposition."

"Yes, but if this had been simply a matter of scraping together a mass of material and stamping it into an outward human semblance —I'm thinking of that green cheese, general, that you're made of—then the anatomical examination would certainly have shown it, would it not?"

"Yes, sir. But what we're up against works more subtly than that."

"All right. I'm open-minded. But we find nothing abnormal about the appearance of the body. Nothing an ordinary human would notice. And we cut it up and find nothing abnormal about the structure of it. If any doctor had been called to carry out a post-mortem, it would have seemed like a perfectly human body to him. Any anatomist would think it was a human body. *You* say it was the chemical structure. I see here in this report a long complicated series of analyses. It looks to me as if there are only a few substances out of line. Here, point out to me a few of these abnormalities."

"Well, here, senator, in the hair, and here, in the nails—"

"I see. Yes, and I also know that this body was decomposing, on a strange planet, that there are natural variations both in structure and in chemical balance among perfectly ordinary human individuals, and that your orders were to destroy the planet *if the body of the scout wasn't there.* Did your orders say, 'Destroy the planet if the scout's fingernails aren't up to specifications?' "

"No, sir. But—"

"But that's what you did, isn't it? You *did* destroy the planet, didn't you? Because these few chemical compounds didn't happen to be just the way you wanted? *Answer the question!"*

"Yes, sir. Because the implications of those few chemical compounds—"

" 'Implications of the chemical compounds,' " mimicked the sena-

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tor. "Let's think of the implications of your actions, for a change. Do you know that planet would ultimately have supported *three billion human beings?* Do you know you blasted out of existence the homes and futures of three billion people —for a set of fingernails? Where will these people go? Their world is destroyed! *You* destroyed it! And if you destroy the future, the possibility of existence, of a human being, how is that different from destroying the human being himself? I indict you, general, for the destruction, the murder, of three billion colonists and their descendents, down through the mists of time, they and their children and their children's children, in uncountable multitudes, that can never exist, that have been blotted out of existence, because *you* didn't like a man's fingernails!"

Cutter, drenched in perspiration, looked at the phone resting on his desk, that he could pick up very easily to cause the destruction of the planet and the ending of all doubt. He saw the phone through a mental haze of imaginary shouting jeering people, senators and spectators, their accusing fingers pointed at him, the bright lights dazzling him, his perspiring features reproduced in a billion homes, an object of contempt and hatred.

"No," he said. "I can't do it. It isn't right. Nobody can ask me to do that."

Driven by the nightmare generated by his own brain, he picked up the phone.

"Sir?" came the waiting voice.

"I want everything within a hundred-mile radius of that scout ship smashed to powder. That's all."

"Yes, sir. About the servo-dissectors, sir—"

"Destroy them," said Cutter shortly.

"Yes, sir."

Cutter hung up. He glanced at the solido of Dione. He looked at it for a long time.

On the other end of the wire, the orders were going out. In one detail, they were different from what Cutter intended. The simple, obvious way to destroy the remote-control devices near the scout ship was simply to leave them where they were. At the center of a hundred-mile radius of destruction, they would be smashed to dust.

But Cutter had only said, "Destroy them." He hadn't specified how. Now the order went out. "Activate the suicide circuits."

Cutter, unaware of this, and seeing an end to his dilemma, began to breathe easily again.

At Luna I HQ, Lieutenant General Bradley Matthews frowned and leaned back in his chair. He hadn't had again an attack of sickness such as he'd had after Cutter left to make his call to Earth, but he'd had plenty of indigestion. He was having an attack right now, and he asked himself, Why? He frowned. It all dated

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from that talk with Cutter. He leaned back, scowling, and after a long while, slowly sat up.

He was remembering Cutter's hearty frontier manner, quickly dropped when a little heat was applied. He remembered Cutter's arguments in favor of easy measures to preserve planets for future colonists, and his own reluctant agreement on easy measures, so long as the body of the scout was there.

But there was the cause of his trouble.

Cutter was the wrong man to carry out such orders ruthlessly.

Matthews' indigestion vanished in a sudden burst of anger. His hand shot out and gripped a bright green phone on his desk. He jerked it viciously off its cradle. A voice replied, "Max. Priority." Matthews said, "All traffic outward of Sental III is quarantined, with immediate effect. The direct Sental-Earth subspace route is closed, with immediate effect. Move reserve groups IV, VI, and X forward along the axis Sental-Felis. Halt all traffic moving inward toward Sental, or laterally across the axis Sental-Felis, or breaking from subspace anywhere within range in the region outward of Sental. Attack and destroy without question any traffic which disobeys the halt order. There are no exceptions to the halt and destroy orders for any circumstances whatever. There is to be no physical contact with any of the halted ships for any reason whatever."

"Yes, sir. At once, sir."

Matthews slammed the phone in its cradle, got up, paced the floor, and abruptly snapped on the three-dimensional stellar chart.

The voice spoke inside its head, almost simultaneously with its own shock:

"WHAT WAS THAT?"

Directly across from it was the grapple, a low armored creature with retractile eyes, four very long snaky limbs that spread out and disappeared in the marsh grass, and a large and a small set of powerful pincers at one end. The grapple had two of its snaky limbs bunched and pulled back, three of its eyes were extended on wiry stalks, and the large and the small pincers were poised, open, above the bunched limbs. The pincers snapped shut with a loud *clack*, abruptly the eyes swiveled outward, and the limbs violently unbunched, snaking out in the long marsh grass. The pincers dove out of sight in the grass. Two of the eyes retraced almost out of sight, and the third straightened, to wave stiffly and gently among the stalks of tufted grass. The armored body was motionless, like a low lichened rock among the mossy hummocks.

Suddenly the voice said, "It *had* you!"

"I was careless. This body could have escaped. But I forgot that it had no experience with grapples. No stored recognition patterns or

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get-away reflexes. It was my fault. I should have used direct control."

"The point is, It *had* you. And yet, you *did* escape!"

There was a brief pause, and this fact sank in, to be followed by blank astonishment. "It must have let go. All I felt was the shock of capture. Then I was free."

"We were in contact with both of you. It didn't let go."

"But—that's impossible."

A faint gliding movement caught his attention. Abruptly he was aware that the low "rock" which was the grapple's body was no longer on the far side of the large mossy mound, but had imperceptibly eased alongside of it. Then the grass rippled in a long wave.

He hit the water with a flat slap. The hard grip at his ankles yanked him feet first through muck and grass. A second limb snaked tight around his chest and waist, pinning his arms to his body. Eyes on wiry stalks arched overhead. A large set of pincers loomed above him.

In a flash he saw in clear detail a section of swamp he'd been looking at a moment before. Something happened so fast he was aware of a brief vague sensation of gripping something beside and around him to thrust his body in relation to it.

He was standing forty feet from the gray "rock" that was the grapple's armored body. This time he did not remain standing there. With little urging on his part, the body sprang carefully and accurately from hummock to hummock, eyes alert for any gray, rocklike thing anywhere ahead or to the side.

The voice spoke in his head:

"WHAT DID YOU DO?"

Brigadier General Cutter looked at the phone, scowled, and said, "What's that?"

"Sir, the servosurgeon and servo-analytic rockets aren't destroyed. The suicide circuits won't work."

"Why bother with — Oh, I see," He frowned.

"Instead, sir, the probes mounting these devices are headed back toward the ship."

"We can't have that," said Cutter. "Put them back down near the scout ship, and blow them up with it."

"Sir, they won't go back down. They don't respond to signal."

Cutter glanced at the solido of Dione. He hesitated possibly a fifth of a second. "Open up with fusion guns. Burn them up."

"Yes, sir."

Cutter held the phone and pressed down the short plastic bar in the phone's cradle. He glanced at the solido of Dione. He let up on the bar, and said, "Missile Electronics."

There was a moment's delay.

"Sir?"

"What are the odds that the suicide circuits on the servo-equipped probes we set down on that planet would refuse to obey the trigger signal?"

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"Sir? Just about zero."

"And what chance is there that the probes would then head up on their own and start for the ships?"

"Impossible, sir. Unless someone down there got into the circuits and altered tnem. Or, possibly, if they had a very small sensitive remote-control tool, and got it into the C-box."

"What's in there?"

"Sir, I'm forbidden by regulations to discuss it. But if a very sensitive complex tool, capable of exerting a small pressure in the right directions, was somehow gotten in there, the probe could be remote-flown from outside."

"Would this be hard?"

"It would be fantastically complicated. The tool would have to be collapsible, capable of being worked in through a narrow channel, and remote-controlled somehow to exert pressure in the right directions. But that's how it could be done."

Cutter nodded. "Thank you."

He put the phone in its cradle, and sat staring at the staff reports.

It stopped the swift running of the body across the marsh, and looked back toward the grapple. Only a bit of the gray body was visible, blending with the low hummocks of moss and clumps of marsh grass.

This time, the shock of capture and escape was more violent. He could still feel the grip of the tight contractile arms at waist and ankles. He could still see the eyes on stalks against the sky, and poised just above him, the powerful pincers. His own reflexive fear of the pain the grapple could inflict on his host, and through the nerves of his host, on him, was compounded by the host body's own reaction—a violent pumping of blood and rapid respiration that built up the sensation of fear. Angrily, he thrust these feelings aside, and concentrated instead on the memory of his escape.

Something had happened. But what? Carefully he scanned the body's central nervous system, seeking the faint traces that would reveal patterns of nerve connections set up briefly, used for a bare instant, then lost again. This failing, he groped to recover the memory of what had happened. Holding the other activities of the brain to a bare quiet minimum, gradually he recovered the memory. Working from the memory, he strove to gain a conscious knowledge of whatever it was that had enabled him to get away from the grapple.

Bit by bit, it became clearer, and as he remembered, he carefully traced the nerve paths, trying to locate the exact form and sequence of nerve currents that had set the process in action.

After a long silence, the voice said, "You have it. That's what happened."

"But will it work if I initiate the process consciously?"

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There was a moment's hesitation. "Try it and see."

He hesitated.

"I'm not quite sure of the right sequence. It seems to me there is some sort of master impulse that comes first, and cuts out interference. But right after that—I don't know."

"Try anyway."

"Yes. But what if—"

"*Try.*" The voice had an urgency that communicated itself to him, and told him that there was more than curiosity behind the demand.

Carefully, trying to follow the remembered pattern, he sent out the nerve impulses.

Cutter held the phone to his ear. "*Completely* destroyed?" he insisted.

"Yes, sir. Flashed to vapor. We got the lot of them in quick succession."

"They were still headed for the ships?"

"Yes, sir."

"We have complete records of the incident?"

"Yes, sir. Beginning to end."

"All right. Carry out your orders to destroy the scout ship and its environs."

"Yes, sir."

Cutter put the phone in its cradle and got up. He had a hard problem to work out.

After what had happened so far, he was going to have to destroy the planet. There was no way out of that. He would *have* to destroy the planet. After his superiors saw the record of what had happened here, they would crush him if he left without destroying the planet.

But he had to destroy it in such a way that it would look good to the colonists.

He began to pace the floor.

The initial nerve impulse had gone out correctly, but now instead of finding himself at the plot of tufted grass he had visualized, he was instead swamped with flashes of color, and a sea of unfamiliar verbalizations that washed into his consciousness, drowning him in a flood too great to endure.

Desperately, he choked off the nerve impulses, and the process, whatever it was, faded out entirely, leaving him with a few strings of words that his host's brain belatedly responded to, giving him the thought behind the words:

"I've got to smash this planet. But how to do it and not antagonize the whole frontier?"

And from a deeper level, the thought came through:

". . . I ought to destroy it now. I ought to destroy it now. I ought to destroy it now . . ."

And from a still deeper level:

"Dione . . . Dione . . ."

Puzzled, very carefully, he permitted the nerve currents to flow again.

And he picked up the welter of verbalizations. But this time he

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found he was able, like a beast of prey following a trail, to sift very carefully through the confusion for the familiar scent he was tracking.

Cutter was standing still, scowling. For a moment, he had completely lost track of his own thoughts. He saw Dione's solido, and was conscious of a sudden, almost embarrassing rush of emotion. An instant later, he was aware of the desperate importance of destroying this planet before it was too late. He reached for the phone, and paused, remembering all the irksome complications that would follow the destruction of the planet.

He wavered, seeing the angry colonists petitioning their representatives, and their representatives calling him and grilling him on his thoughts, purposes, intents, and rational justifications. And it would all take place in a fantastic publicity display that could turn in any direction at all, and leave him suddenly a has-been as a result of one wrong answer in a situation where the basic structure of right and wrong was hidden like a reef till he either hit it and was wrecked, or accidentally came through the unseen channel and suddenly realized with surprise that the ordeal was over.

But if he didn't do it, if he *didn't* destroy the planet—

Suddenly exasperated beyond enduring, by all the pros, cons, and imponderables, Cutter suddenly threw the whole mass of complications out of his mind.

The solido of Dione caught his eye, lush, seductive, demanding.

Demanding?

Cutter blinked, studying the construction of the woman's jaw.

His gaze traveled the curving length of the lush body, came back to the jaw, flicked up to study the shrewd eyes and empty face.

He spat an ugly curse, knocked the solido off the desk, cast a brief glance at the staff report, and picked up a phone.

"Sir?"

"Check out four subnuclear triggers—"

"Sir, we've got half-a-dozen checked out and ready to go. It's SOP on this category mission."

"You've also got suitable target areas selected, to destroy the planet?"

"Yes, sir."

"Destroy the planet."

"Yes, sir."

The host's brain interpreted the order, but there was a lapse of time before the full meaning came through. Even then he wasn't certain that this was what it actually meant.

The voice was not so hesitant:

"You're picking up the thought of the commander of a space fleet with the power to destroy this planet. You've got to stop him!"

"But I can't! How could I—"

"We've had time to analyze the

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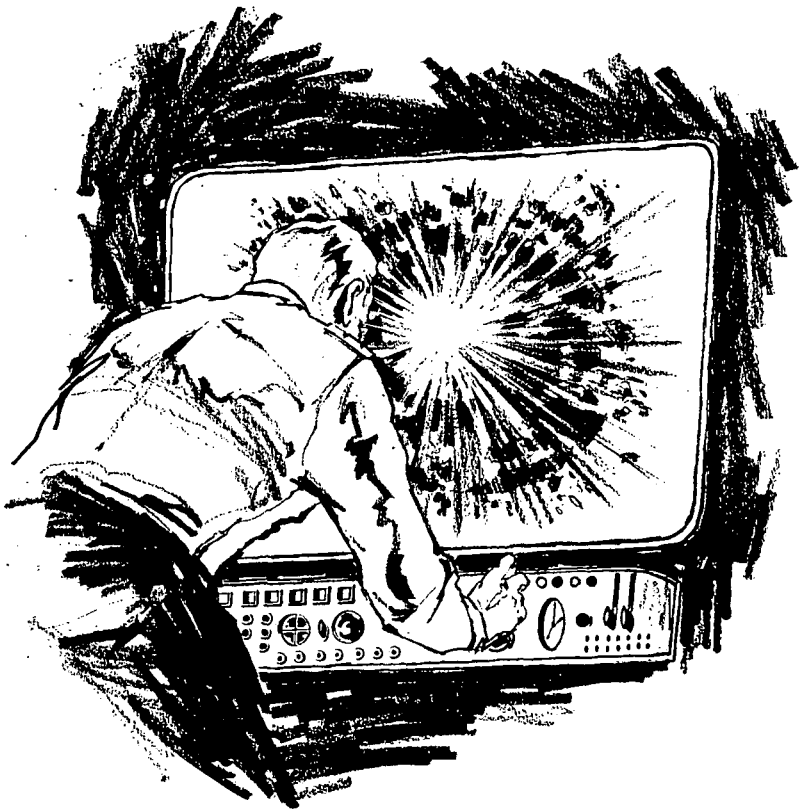

process you've followed. You are using nerve paths that the host creatures rarely ever use, and are hardly aware exist. Ordinarily, a great deal of training would be necessary. just to develop the nerve tracts, and special organs involved.. But in rebuilding this body, we repaired damage resulting from neglect and disuse as well as injury. We didn't know where to stop, so we evidently developed certain organs that are still normally in process of evolutionary development. You've used these twice to escape destruction. *Now you've got to do it again.*"

"I don't know what to do!"

"The escape mechanism seems to operate when you visualize clearly the place to which you desire to go."

"But if the *whole planet* is to be destroyed—"

"Before you received the auditory sensations a moment ago, there were *visual* sensations. If you could filter out all the distracting sensations, and concentrate on *one clear visual picture*—"

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"Yes," he said suddenly. "I see."

"Can you do it?"

"I'll try."

Once again, he let the nerve currents flow, and this time he struggled to recover the flashes of bright color he had ignored before. At first, there was no visual sensation at all. But as he carefully varied the current, there was a brief glimpse of gray, and he concentrated on it intently.

Brigadier General Cutter was pacing the floor, cursing the vacillation that had led him to waver and debate with himself when the only thing to do was obvious.

The basic cause of his trouble looked appealingly up at him from the floor, arms outstretched. Cutter booted the solido across the room, and felt a vicious satisfaction as it smashed into the bulkhead.

He felt a brief wave of dizziness. His vision nearly blanked out. He caught the desk for support, and then the phone was ringing.

By habit, he groped for it, and held it to his ear.

"Sir, the subnuclear triggers have impacted and fired."

"The planet is destroyed?"

There was an instant's hesitation at this question, then the dutiful answer, "Yes, sir. Certainly."

"Good."

Cutter hung up.

He told himself that he should have felt relief at that comment. But he didn't.

The spell of dizziness had passed away.

Cutter looked up.

With the effort to control the nerve currents, and to focus precisely on the gray visual image, had come a desperate sense of urgency. He had lost consciousness of everything else in the effort to define that fuzzy image. And when he had defined it, when he saw it clearly, there was a brief moment of unbearable intensity, and then—a sense of relief.

He was standing in a gray-walled room, looking at a man—a host organism just like his own—replace a black plastic "phone" in its black plastic "cradle."

The man looked up—and stared.

Cutter saw the naked figure, its appearance godlike in the definition of massive muscles and the healthy glow of smooth skin. For an instant, Cutter was unable to move.

The figure stepped forward and clasped him by both wrists.

There was a sharp, piercing pain in Cutter's forearms.

Suddenly Cutter jerked back from the desk, and tried to wrench his hands loose.

The figure on the other side of the desk smiled, leaned forward, and rested its weight heavily on the pinned wrists.

Cutter tried to knock the phones from the desk. He tried to butt the massive figure that gripped him. The silent struggle went on.

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Abruptly, Cutter recovered from his shock.

He sucked in a deep breath, to shout at the top of his lungs.

Sight and sound began to fade. He felt a brief dizziness.

The godlike figure stood over the slumped general, looked around the room thoughtfully—and then vanished.

He was lonely.

The voice, a manifestation of a whole planet taken over and controlled by his kind, was gone. Wiped out. But it would speak again, in time, if he could spread his kind throughout the ships of this fleet. To do that, he had, he found, to carefully scan the thoughts that came to him, find some that he could identify as coming from one of the nearby ships, focus intensely on the visual sensations accompanying the thought, and find a host organism that was alone. Then he need only restrict his attention to the visual sensations, and when there was that undefinable moment of discontinuity, he found himself physically close to the new host organism, which he seized by arm or throat long enough to pass one or two of his kind, and then he pinned the host organism till the original consciousness of the host lost the struggle for control.

Then he moved on.

Soon he had a host organism on each ship of the fleet.

Unfortunately, not all of the hosts were in controlling positions on their individual ships. To get at these particular hosts required a delay while the reproductive process created new master organisms. But the delay was not important. His kind had gained control of the chief host organism, and that was what *was* important.

The body of Brigadier General Cutter moved at the desk, straightened, and looked around. Two of the phones were ringing. Cutter's hand picked up one of them. There was a moment of listening.

"Yes," said Cutter's voice. "We will check both of those planets. There's no reason whatever for a change of plan. And then, when we're through—

"Then we'll head back to Earth."

Lieutenant General Bradley Matthews, the three comets of his rank glinting at his lapel, looked at the incomplete transmission that had just come in:

"LANDING ON FELIS IV TIME"

Matthews looked up at the communications officer.

"This is all that came in?"

"There was a lot of gibberish preceding it, sir. The message ended abruptly at the word 'time.' "

"Let's see the gibberish."

"Sir?"

"The meaningless part of the message. Where is it?"

The communications officer

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stared at him, then saluted and left the room in a rush.

Matthews looked back at the message.

"LANDING ON FELS IV TIME"

The voice was back.

Not quite the same voice.

Not, perhaps the voice of a brother, but the voice at least of a cousin. Still, it was the voice. The voice that told him he was not alone in a hostile universe, but immersed in the affairs of his own kind. The voice that told him he was no longer one of a little band of lonely explorers, but had the resources of a civilization at his back.

To the eye and mind of the host organism, the planet was commonplace. To him, conscious of the ruling species that controlled all the diverse life forms, the planet was home.

When he left, he intended to take home with him.

"There it is, sir," said the communications officer. "That's an exact copy of the original."

Matthews studied the sheet of paper:

AZAZRGHORABNLOKDLDMSARTEEDQHMFAEQNLARNLDAJHMCANEACHRDZRDANQA

Matthews glanced down the paper. The jumble of letters went on for better than two dozen lines, and it all looked about the same.

"Just gibberish, sir," said the communications officer, frowning uneasily at the paper.

Matthews' attention was caught by the first four letters, "AZAZ." The first and last letters of the alphabet. Idly, he wrote out the alphabet, and below it, the alphabet reversed. The A and Z were now opposite each other at the beginning and end, so that when he glanced over the paired alphabets counterclockwise, the letters at the two ends read "AZAZ."

"Sir," said the communications officer, "if anyone had wanted to send us a message, he could have used the standard code."

"Yes, but what if he hadn't wanted the people around him to know what he was saying? Suppose he just wanted them to think he was sending . . . say . . . a test transmission?"

"Well—"

Matthews felt more and more certain he was right. Ignoring the communications officer, he substituted the letters of his paired alphabets, and wrote:

ITSJIWYMOJPWOW

The communications officer cleared his throat.

Matthews frowned at the paper. "IT" was encouraging. "IT'S" was all right. But what to do with "JIWYMOJPWOW"?

Matthews became conscious of the amount of time that could go down the hole while he wrestled with this.

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He glanced up at the communications officer, saw the I-told-you-so look on his face, and suddenly remembered that rank *has* its privileges.

"Get to work on this," said Matthews briskly, "and decipher it. I'm inclined to think it's a substitution cipher of some kind. And demand an explanation of that 'Landing on Felis IV' message that came with it."

The communications officer glanced at the sheet of gibberish, looked blank, said "Yes, sir," saluted, and went out, leaving the copy on Matthews' desk.

Matthews shoved it to one side, and tried to consider other matters. A landing on Felis IV would mean—what? That the planet was clearly safe? That Cutter's expedition had somehow already been taken over? That some unforeseeable emergency had forced the landing?

Frowning, Matthews pulled the sheet of paper over and looked at it:

AZAZRGHORABNLOK . . .

The voice was still there.

As the fleet moved, the voice moved with it, evidence that the fleet and every creature on it served as transports for an invasion force of the master organism. All that was needed now was a supply of new hosts. To that end, their suspicions must be stifled before they could arise.

A long message went out from the fleet to human headquarters. The main parts of the message read:

. . . INFECTED PLANET DESTROYED BY SUBNUCLEAR ATTACK STP OTHER TWO PLANETS HARMLESS STP . . . COMMUNICATOR MALFUNCTION GARBLED MESSAGE WHICH FOLLOWS . . . REMOTE TESTING DEVICES LANDING ON FELIS IV STP PLANET SEEMS OKAY SO FAR BUT TIME WILL TELL STP . . . END OF PRIOR TRANSMISSION STP . . . MISSION COMPLETED STP RETURNING EARTH BY WAY OF SENTAL II IMMEDIATELY STP . . .

There was a rap at the door, and Matthews looked up.

"Come in."

The communications officer, a sick look on his face, came in and saluted. Wordlessly, he handed Matthews a sheet of paper that read:

SHIPS COMPLEMENT SUFFERING FROM SOME KIND OF DISEASE OR SPIRIT POSSESSION STP THERE ARE LONG PERIODS OF SILENCE WHEN THEY SEEM TO MERELY INACTIVATE THEIR BODIES STP THEY ACT TOGETHER AS IF GUIDED BY TELEPATHY STP I AM SYSTEMS REPAIR TECHNICIAN IRA BENTLEY STP TWICE THEY HAVE GRABBED ME BY THE

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WRISTS AND HELD ME TILL DIZZINESS HIT ME STP I THINK I AM IMMUNE STP DO NOT LET THEM RETURN TO EARTH STP

The communications officer cleared his throat. "Simplest form of substitution cipher, sir, with 'A' inserted between the ciphered words."

Matthews picked up the green phone by his desk.

"Max. Priority," said a respectful voice.

"The ships of General Cutter's expedition," said Matthews carefully, "wherever they are found, are to be attacked and destroyed without warning. They are to be attacked the instant they are recognized."

"Yes, sir."

Matthews put the phone down and glanced at the communications officer, who saluted and went out.

Matthews briefly studied the star chart, and learned nothing new from it.

There was little to do now but wait.

"We have carefully developed the special organs and nerve paths of each of these host-organisms in order to take advantage of the undeveloped capabilities of the host. At this distance, and without more practise, we can't be certain, but the reports we have been able to get are not very reassuring. You've had more practise than the rest, so before we finish the approach to Sental II, perhaps you'd better tell us if you agree with the other observations."

Matthews slid the coil back into his fission gun, gave a quarter turn to lock it, thumbed down the safety, and put the gun back in the open drawer, within easy reach. He returned his attention to the report on his desk, turned the page, and read:

". . . But telepathy is only one of these hypothetical powers. Also mentioned frequently are: precognition—the ability to at least partially foresee coming events; clairvoyance—the ability to see, without use of the visual organs of vision, and unrestricted by physical obstructions; clairaudience—the same type of thing, as applied to hearing; teleportation—the ability to transfer objects, including the body from one place to another, without visible physical means. There are many others, and also variations of the ones already mentioned.

"Thorough scientific investigation of a variety of persons offering to demonstrate such powers has revealed many instances of fakery, carefully detailed at the end of this report, and also a number of instances in which no fakery was found, so that the investigators were evidently duped.

"Save for a few examples drawn from ancient texts, which have gone through many translations, there ap-

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pear to have been no instances of commercial or military application of these powers. Indeed, such application is forbidden by various injunctions. This is apparently with the purpose of forestalling in advance any challenge for a demonstration, since such commercial and military utilization could obviously be highly profitable.

"Some few public demonstrations are reported to have taken place, but these can either be duplicated by physical means, in which case their method of operation is clear, or they plainly must be instances of mass hypnosis, hysteria, and confused memory on the part of the participants.

"Thus, impartial evaluation of the records reveals . . ."

Matthews circled the word "teleportation," and read again: "the ability to transfer objects, including the body, from one place to another, without the use of visible physical means."

He was thinking of Cutter's argument that a planet would be safe if ringed by subnuclear missiles, since—how could anything leave the surface of the planet without the use of physical means?

Matthews glanced at the deciphered message: THEY ACT TOGETHER AS IF GUIDED BY TELEPATHY.

Assuming that some minute creature were able to invade the human body, and having invaded it, could take control of it, vary its form at will, and eventually utilize powers that the human himself scarcely knew existed, how could anyone possibly hope to withstand the creature? All that was needed was to blunder onto a planet occupied by it, and the fight was all over. If such a creature existed anywhere in the universe, what chance was there for humanity? First contact meant automatic defeat. How *could* there be a defense against such creatures? All they had to do was to seize control of one human, and all the rest was just a matter of going through motions.

He picked up the green phone and spoke into it, choosing his words carefully.

The voice was hopeful. "Were we wrong, then?"

"No," he said uneasily. "Far from it. The instant our ships appear off Sental II, they'll be destroyed."

"Unfortunately, we can't approach Earth without either making a long circuit, or else pioneering some new subspace approach—which might bring us out inside some physical object and destroy us—or else coming in on the known subspace route to near Sental II."

"The other two approaches give our opponents time to prepare. Couldn't we do as you did when you seized control of Cutter and his ships?"

"Not this time. They're in pairs. They're well-armed. No doubt, after a terrific struggle, we would

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eventually get control of the ships of that fleet—assuming we could move fast enough when we broke out of subspace—but what then? What if *those* ships were destroyed? The controlling entity obviously is in a mood to do just that."

"Then we will have to try to bypass all this. We will have to try something else that these organisms seem to be potentially capable of. We will have to try to boost the power of these nonphysical effects. Possibly we can form a linkage, act together at long range; and strike at the nerve center of the ultimate control organism. But we will have to act quickly. The longer we wait, the more likelihood of some disastrous action that will destroy great numbers of the host, to no purpose."

Lieutenant General Matthews heard the soft step, and looked up.

Naked, eyes blazing with tension, the godlike figure moved forward in a blur.

Matthews fired, whirled aside, and fired again, as a second figure appeared at the other side of his desk.

Powerful hands gripped his throat from behind.

His right heel smashed down by reflex action, to snap the small bones of an unprotected foot, at the same instant that the raised muzzle of his gun found the head of the figure behind him.

There was a sudden warmth at his left shoulder, but he was free, firing again and again, as the room around him turned into a slaughterhouse, and then suddenly there was no more opposition.

He felt a wave of dizziness, and aimed the gun as his own head.

The dizziness faded.

There was an intense pain at his chest. A gray curtain seemed to fall before him to cut off his vision.

He struggled in vain to raise the gun and squeeze the trigger.

But a delicate thermal switch cemented to the roof of his mouth took note of the typical fall in body temperature, and faithfully sent out its signal.

In a dazzling flash, the room dissolved.

"Close," said the voice. "Our losses are nearly forty per cent. But the stubbornness of the opposition makes no ultimate difference, since we won. As we had to win. There really was no way they *could* have won. Now it's just a matter of cleaning up."

The messages began to come in now, calling for help from scattered parts of human-controlled space. These messages told of a spreading nightmarish life form, capable of using humanity as humanity uses beasts of burden. The messages called for help from Earth. The replies were always soothing, and the help quickly forthcoming. Once the help arrived, there were rarely any further com-

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plaints. The diminishing flow of messages that came in told the story of an interstellar human civilization sixty per cent, eighty per cent, ninety per cent overcome in a fight carried out without quarter by an overwhelmingly superior opponent.

And then, at last, the messages calling for help came in no longer.

The fight appeared over.

It was then, at the moment of final victory, that the radiation barriers began to vary in strength.

The voice was concerned:

"This oscillation of the radiation barriers has never happened before?"

"No. I find no mention of it in any of the records available to the electronic computers the humans used. No record at all."

"And, there is no memory of it. We have lost a comparatively small percentage of them, and the memories of those we have all agree. This has never happened before. We know that we have completely conquered the human race, that we have occupied Earth, its home planet, and that we now control the race and all its resources. We know in addition that there is one more radiation barrier, inward, toward the center of the galaxy, that they had not yet reached on their own. Thus, they occupied a very large box of space. We now control them, and through them the suns and planets within the large volume of space. But we actually know nothing of the nature of these radiation barriers, except that they are fatal. So, how will we—"

The frequency of the oscillations varied, all around the enclosed volume of space, as if seeking a value at which space itself would respond.

There was the sudden flare of innumerable points of light.

The stars seemed to multiply.

Space lit in a dazzling haze as interstellar dust burned white.

Spaceships flared and burst.

The atmospheres of planets lit in dazzling auroral displays.

The oscillations came to another fine adjustment.

The stars seemed to dull, as their planets blazed in a fiery glow.

The Voice cried out, then died away.

The radiation barrier farthest out, toward the rim of the galaxy, began to move in, toward the center.

Lieutenant General Bradley Matthews became aware of consciousness. An instant later, he remembered his last physical actions. He felt a sense of grim satisfaction, that he had been able to take a few of them with him, and that he had blocked their attempt to capture him. But then, why could he still think? Where was he now?

"Steady," said a quiet feminine voice, very close to him.

Matthews tried to speak, but was unable. He thought, putting the

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thought in words, "Where am I?"

"In cubicle 68654 tier AA layer AB of the transit ship *Arcturus.*"

Matthews thought this over for a long time.

"I don't understand. How did I come to be here?"

"You volunteered on New Mars, made the necessary qualifications trip through a colonization center, discovered the type of planet for which you were best suited, reported for the first trip, and—here you are."

"I volunteered on New Mars, you say?"

"That's right. I have your file at my elbow."

"I seem to have . . . well, lost my memory. Possibly you could tell me a little more."

"Your age is twenty-four. Your field of specialization is densitization, with particular emphasis on cooling control. You received your B.S. at Max Mann University on New Mars, took your M.S. and Ph.D. (elementary) at the same school. You transferred to Interstel on New Earth and took your Ph.D. intermediate and Ph.D. (advanced) at Interstel. While you were preparing to take the qualifying exams for your electorate, there was an incident in which another student molested a girl you were interested in, was severely beaten, and died from the effects. You were accused of manslaughter. Because of lack of conclusive evidence, an indeterminate verdict was returned against you. You were expelled from Interstel, and for lack of proper educational qualifications, could obtain only menial employment on New Earth. You returned to New Mars, received your Dns.El., *cum laude*, but because the scandal followed you from New Earth, you decided to leave on the next colonization expedition. Word came that an elimination was going to have to be carried out in Nineteen Prime, with an advance of the Border in that region. This meant a great deal of planet-recovery work, with high tax-free pay. You volunteered. Does any of that ring a bell?"

"I'm a little hazy on this idea of 'elimination.' What's that?"

"Well—" the feminine voice hesitated. "Of course, your stat sheet shows you aren't qualified to understand military specs."

"Oh, of course not," replied Matthews. "But it seems to me I should have *some* kind of rough idea."

"You have to take specs outside your own field for granted. When there's an 'elimination,' that means there's planet-forming work afterward. That's absolutely all you need to know."

Matthews' thought came out with what, if he had spoken, would have been a harsh rasping note:

"If you don't know what it means, look it up."

There was a short tense silence, then the click of switches.

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A stiff feminine voice said, "Here you are, then. Quote: Owing to the danger of infiltration by quasi-human life forms, mental parasites, telepathic life forms, squoits, class-A complex wave-forms, and others summarized in Table 61 below, external compartmentalization is a necessity. Thus, as the race moves inward, quasi-Earths are seeded well in advance of the actual border regions. Using deep hypnotic techniques and refined methods of planet-forming, the initial generations on these quasi-Earths are led to believe that they have a very long, though somewhat confused, history, usually interrupted by one or more natural catastrophes that have apparently disarranged the 'evidence.' Believing firmly that they are the original and only humans, they proceed to colonize the surrounding region of space.

" 'If successful, they are in due time made aware of their actual line of descent, and are allowed to join forces with the "elder race." If, however, they are invaded by any of the aforementioned life forms, or others not yet discovered, we learn of the danger through taps on their communications system, observation by molecularized detectors, and other means which need not be detailed here. In such a case, the entire affected compartment of space is subjected to a complex process based on substrate energetics. The result of this process is the elimination of all organized life within the affected compartment.

" 'Following this "elimination," the nearer energy wall of the compartment is advanced roughly two-thirds of the distance to the farther wall, the necessarily slow and expensive planet-forming work is carried out, a new pseudo-earth is seeded in the farther third of the compartment, the outer energy wall is withdrawn, and the inhabitants of the new pseudo-earth, earnestly believing that they are the original and only humans, proceed to carry forward the work of colonization.

" 'This roundabout procedure is a necessity, to prevent infiltration into the actual main body of the human race. This process assures us that the infiltration gains access only to a limited portion of the space under human control, and acquires only the comparatively limited knowledge available to the pseudo-earth race. Before the infiltrating conqueror has time to realize that the preconceptions of the humans it has conquered are false, it is wiped out.

" 'External compartmentalization limits the unavoidable disasters, and enables us, the true, original, Earth race, to continue human colonization of space.'

"End quote," said the prim feminine voice. "And I hope it helps you orientate yourself, though frankly I *don't* think you can understand it without proper qualification."

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Matthews gave a kind of mental grunt, as he slowly absorbed the fact that his whole region of space, with its billions of inhabitants, had been blotted out of existence. At least, he thought grimly, *they* hadn't gotten it.

"What's that?" said the feminine voice, strongly tinged with curiosity.

"I still don't have any clear memory. Are you sure there isn't something you've left out?"

The feminine voice hesitated, then said, "You were depressed when you came on board. You said you had a premonition you would never survive the trip. And you said that after what you'd seen of the way things work out, you didn't much care. I know, because I'm a Med.El., and you talked to me about it. I was assigned to handle your group of the planet-forming crew. Don't you really remember *anything?*"

Matthews told himself that from what little he'd experienced of this only, true, original Earth race, he could see how anyone who'd spent twenty-four years in it could be a little disheartened. But why fold up and quit? Why let a race case-hardened into an academic caste-system get off that easily? A few cracks on the right joints and nerve-centers ought to loosen them up a little.

"You say I'm a Dns. El.?"

"Yes."

"How does that compare with a Med.El.?"

"Well—" she hesitated. "*Some* people say a Dns.El. makes you a professional. I . . . I don't know." Her voice brightened. "*I* don't have any prejudices, myself."

Matthews made a hard effort, and ranks of abstruse formulas, and masses of specialized knowledge rose before his conscious attention, and seemed to pass in review before him. Someone, he could see, had labored hard and long to acquire all this knowledge, and what was he at the end? A mere Dns.El., not truly a professional.

Struggling to form some kind of overall mental picture, and to acquire an insight into the inner meaning of all this knowledge, Matthews made the startling discovery that no understandable unifying viewpoint was to be found. None had ever been offered. All this maze of technicalities lay on the mind like a dead weight, crammed at top speed and largely undigested. But naturally, it would have to be, if one wished to acquire his Dns.El. and start making a living sometime in the first half of his life.

Matthews threw it all out of his consciousness. He'd seen enough to know that he could familiarize himself with it rapidly when he decided to. That was all he needed to know about it now. There were other matters to be looked into.

"And I'm twenty-four, is that right?"

"Yes," said the girl, her voice tense.

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Twenty-four. That gave plenty of time to get something accomplished, assuming he wasn't cut off right at the beginning. What was the tenseness in her voice for? Spurred by an instinct that had seldom, if ever, failed him, he delved earnestly into the memory that opened up to him like the pages of a book.

"You're Sylvia?" he thought.

"Yes," she said, eagerly.

"It's coming back to me. I remember that long talk we had, and the moonlight shining in the big window in the lounge."

"Oh, I'm so glad. I was afraid—Look, you *do* remember now?"

"Yes, I remember. Perhaps at first I didn't really *want* to remember."

"Amnesia is often an escape mechanism," she said knowledgeably. Matthews could see, from memory, that the girl was fairly pretty. Her figure wasn't bad, either. But there was something about her habit of thought that grated on him, and he told himself, being careful not to verbalize it, that possibly he could find an ill-educated Ph.D. (advanced) a little less frozen into the rut.

"Excuse me," she added contritely. "Of course, you can't understand that. It's just the way we Med.El's talk."

"Oh, of course. What were you worried about?"

"Well, sometimes someone comes out of depth with a—Well, some of them argue and insist they're really someone else. The psychologists say it's a 'traumatic transference psychosis.' It's out of my field, and I really don't know much about it—"

And neither do they, he thought, being careful not to verbalize, but they've got a name for it, so, of course, it's all right.

". . . But the psychologists say it's a very serious condition. I was afraid when the amnesia lasted so long—But it's all right, because you remember. Of course, the trouble is, you were motivated badly."

"My motivation is all right now."

"Of course. There's often a heterochronic effect in the alleviation of motivational deterioration." She made a little sound of distress. "But of course, you can't understand." As if sensing that possibly she had trodden heavily on his sensibilities, she said hastily, "In just a little while, when you go to work on the planets, *I'll* be the one who doesn't understand. I think it's always so nice when there's an elimination, don't you? It makes so many opportunities. Here, I'll bring you out."

Matthews considered the fact that the "elimination" she was so happy about had resulted in the death of billions of his own people. But, of course, she didn't know. It was out of her province.

There was a strange sensation as the warm liquid drained away from him, and light burst on his eyelids. There was an instant when a voice

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seemed to say to him, "You see how they are, and the way they think. These so-called 'only true humans' in this particular space-time compartment are caught in a trap of the mind. They will finally end up in very much the state of insects, on a grand scale, if we can't break them loose somehow. You happen to be the forty-seventh instrument we've chosen to initiate the attempt. Can you at least understand the point? Will you at least *try* to do your best?"

"Don't worry," Matthews thought grimly. "You can count on me." ■

THE ANALYTICAL LABORATORY

We have two months to report on, but it's time to repeat, for new readers, the mechanism of the An Lab here. Readers are invited to vote for the stories in each issue, naming them in order of preference. These votes are entered on a table; a story voted first place, gets a *1* on its scoreline; second place earns a *2*, third place earns *3* and so on.

When the time comes to make up An Lab, each story's vote-score is totaled, then divided by the number of votes, to find the average "point score". The story with the lowest point-score—ideally, it would have been voted first by everyone, and have a point-score of 1.000—wins for its author a 1¢ per word bonus. The next-lowest point-score wins a ½¢ a word bonus.

So—if an author's done you a favor, and given you some solid entertainment, reward him! It'll cost only a postcard or letter—and this An Lab means a bonus approaching $500 for Frank Herbert!

FEBRUARY ISSUE

PLACE	STORY	AUTHOR	POINT SCORE
1.	Prophet of Dune (Pt. 2)	*Frank Herbert*	1.86
2.	The Mailman Cometh	*Rick Raphael*	2.47
3.	Coincidence Day	*John Brunner*	2.98
4.	Photojournalist	*Mack Reynolds*	3.45
5.	The Pork Chop Tree	*James H. Schmitz*	4.29

MARCH ISSUE

1.	Prophet of Dune (Pt. 3)	*Frank Herbert*	1.76
2.	The Iceman Goeth	*J. T. McIntosh*	2.64
3.	Balanced Ecology	*James H. Schmitz*	2.78
4.	The Wrong House	*Max Gunther*	3.23
5.	Legend of Ernie Deacon	*William F. Temple*	4.13

THE EDITOR

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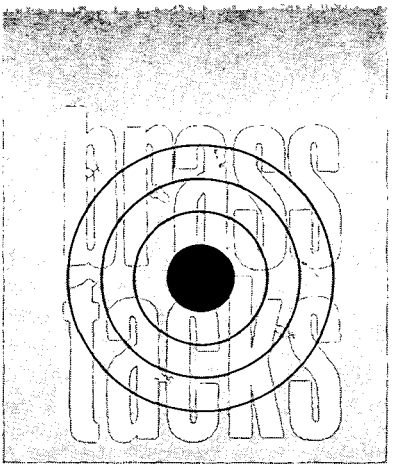

Dear Mr. Campbell:

In the article by Mr. Dawson and Mr. Bova in the December issue of Analog there are two photographs of starfields which, according to their captions, show galaxies at distances of 120 million and 1 billion light-years from Earth. After studying the photographs carefully, I have come to the conclusion that either the negative of the photograph on page 14 was seriously underexposed or someone switched the captions on the photographs. A close examination of the photograph on page 8 reveals that, as the caption on page 14 says, it is easy to distinguish spiral galaxies from elliptical ones. This is not true on page 14, however. In fact, even with the help of the bars provided as an aid, I was unable to detect even a slight graying of the background in at least four of the areas indicated as containing galaxies in the photograph on page 14. While caption switching of this sort is admittedly unimportant, you must admit that it can make things rather confusing for the reader.

KENNETH G. VALENTINE
325 East Akers Hall, MSU
East Lansing, Michigan

1. You're 100% correct—the captions got scrambled.

2. You (and we) were unlucky; some individual copies of the magazine did show the faint gray smudges of the billion-year-old light, but the high-speed presses couldn't hold such fine, faint detail. It's not what you'd call prominent, even in the original Mount Palomar photographic prints.

Dear Mr. Campbell:

I agree with your January editorial, but it won't do the people it's aimed at any good.

Since you contend that the Barbarian is a genetic type, it must also be true that the "social-liberal" is a genetic type—he *enjoys* fooling with Barbarians, just as physicists and chemists enjoy fooling with dangerous materials. The Barbarian can't learn to like working constructively, and the "social-liberal" can't learn that the Barbarian is a hopeless case.

Therefore the "social-liberal" will keep banging his head against the brick wall of the Barbarian's character until something gives—either the liberal's skull, or society's patience with the Barbarian.

When society becomes sufficiently impatient with the Barbarian for

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his brutality toward the citizen-social-liberal, the Barbarian will simply have to go—whether through spontaneous actions of mass emotion, or through the passage of new laws, written or unwritten, making it a crime to be a Barbarian.

ROBERT H. ROHRER, JR.
457 Princeton Way, N. E.
Atlanta, Georgia 30307

That isn't the way history has answered that problem. What has happened—Roman Empire for example—is that the Barbarians take over the civilization, squander the accumulated wealth for a few generations, then amuse themselves fighting among the ruins. This kills off the soft-headed Citizen type that produces the social-liberals, a large percentage of the pure barbarians, and the hard-headed citizen types that—as post-graduate barbarians—can out-fight, out-organize, and out-think the barbarians regain control and start rebuilding.

That full cycle, in its pure form, doesn't often get a chance to manifest itself; usually citizen-dominated surrounding cultures step in when the barbarian induced anarchy disintegrates the culture. Rome demonstrated the full cycle, because there weren't any rival nearby citizen-cultures extant at that time.

The fully developed Citizen actually seems to be every bit as hard-headed, ruthless, and dangerous a fighter as any barbarian—he just uses his ruthless determination wisely instead of egocentrically.

Dear Sir:

This letter is in re your editorial about race riots. In the editorial, you suggested that drugs and/or hypnotism be used to control the barbarians in the midst of the civilization in which we live. This would be a fine idea if it were not for the fact that when you have eliminated the barbarians, the hereditary factors that cause man to "advance" will also be eliminated.

Let us examine this statement. We will use as an example the Negev desert. Here we find that about the third millennium B. C. there was a high culture much like ours. That is, this culture had all the modern "conveniences" extant at the time. We then find that this culture was replaced by a culture that must have been warlike in orientation, for the unwalled cities of the first culture were replaced by walled fortresses in the second. Eventually, the walled fortresses became unwalled cities that were in turn replaced by more walled fortresses. Granted that this took much time, nevertheless, it may be safely concluded that the elimination of the barbarians in the culture so reduced the will of the civilized people in the culture that they lost the desire to protect that which was theirs and so became slaves to the

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barbarians who conquered them.

From the foregoing, I conclude that it would be a mistake to eliminate the barbarian from our culture. It would be more to our advantage to find a place for him as only he will be able to help us survive in the long run.

In the meantime keep up the fine standard that you have in the past.

R. E. ROUGHTON
P. O. Box 196
Huron, Ohio 44839

Not valid!

The Barbarian's emergence from the ages of static ritual-dominated Tribalism was one of the great achievements of human evolution. Just as dinosaurs were one of the great achievements of vertebrate evolution, the emergence of dinosaurs from the earlier amphibians was one of the great achievements of vertebrate evolution.

But citizens have emerged since the Barbarian came. They have all the potentials of the Barbarian—plus!

Stasis sets in when the Tribesman ritual-dominated type gains ascendency; the Citizen is even less static-minded than the Barbarian.

Dear Mr. Campbell:

Obviously, the only Absolute Tyrant Dictator who is going to be able to do anything about the born Barbarian in his own family is one who also happens to be a Self-Disciplined Citizen type. He would be able to ignore his own feelings on the matter and do that which he conceives to be Best for the Entire World.

The dictator with slightly less self-discipline will figure that just one or two barbarians aren't going to hurt his program too badly.

And the one subject to Other-People Discipline isn't going to be able to do anything. Too much Public-Opinion outcry every time he tries.

However, I'm not too sure where empathy fits into your classification of discipline. If your self-disciplined citizen is capable of a strong degree of identification with others, he is just as likely to be unable to act as is the dictator subject to Other-People discipline. Unless he possesses enough self-discipline to ignore his sense of empathy.

At any rate, I wouldn't advocate killing off all the barbarians. A few might come in handy some day for a different point of view among all the self-disciplined citizens which presumedly would be the only types left.

MRS. JOHN A. SWANSON
311 Oak Avenue
Elizabeth, Pennsylvania 15037

Barbarians make excellent, loyal, deadly soldiers. They will fight for a living—and fight loyally and honestly.

A Barbarian is like abrasive grits—invaluable in a grindstone, and utterly ruinous in a bearing.

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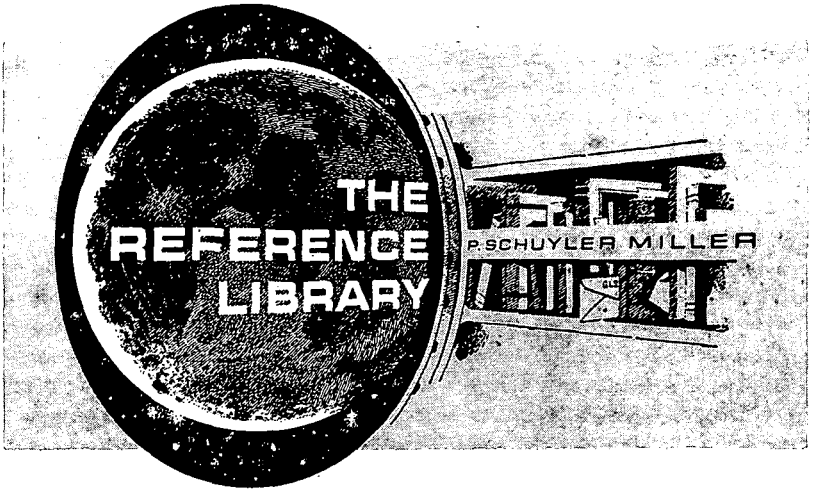

THREE TRADITIONS

One of the most fruitful concepts developed by archeologists in recent years has been that of regional traditions. To a great degree, the stereotypes of the hard-bitten Yankee, the easy-going Southerner or the pragmatic Midwesterner are legitimate. In Louisiana, a distinctive French tradition has survived through the political and social domination of Spain, England and the Yankee United States. The people of Greece remained distinctively Greek for centuries, the Egyptians for millennia.

These traditions result from a kind of social inertia that makes people dislike to change what is familiar. Wars, religions, total political upheaval may sweep over them, but certain ways of doing things—of looking at things—change very little, or at least very slowly.

Although science fiction is outstandingly a literature of change, and of violent and sudden change, the best of it also realizes the fundamental nature of conservatism and tradition. Three of the best post-Doomsday novels of the last few years have been built around this near-invariant: Walter M. Miller's Hugo-winning "A Canticle for Leibowitz," Edgar Pangborn's "Davy," and a third book that slipped out almost unnoticed late in 1964, "Chill of Dusk," by Stephen Minot (Doubleday & Co.; 327 pp.; $4.95). Although similar in theme, they are strikingly different in the traditions they illustrate and the way in which the principle is developed. A fourth book of the same type might be Brian Aldiss' "Greybeard," although in this case I am handicapped by not being able to judge how real his picture of a post-

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holocaust English village may be.

"A Canticle for Leibowitz" builds on the interplay of two great traditions, after Twentieth Century society has been shattered and scattered by a Doomsday war. They are the Spanish-Indian tradition of the American Southwest, probably the oldest surviving tradition in the United States, and that of the Roman Catholic Church, seen again as the preserver and survivor of a sub-tradition of scholarship, in however distorted a form. That the brothers of the future Church copy and lovingly illuminate the circuit diagrams of the legendary Leibowitz is less important than the fact that this process does bring some scraps of structured knowledge through another Dark Age of Ignorance.

In "Davy"—my own choice for best SF novel of 1964—we see a very different kind of tradition at work. I know the Schoharie country of which Mr. Pangborn writes, and can recognize the "Schohar" of the future. No church is involved in this case; the people themselves have preserved and modulated a regional tradition of their own, which keeps them closely related to the valley where they live and warily leagued against outsiders. The past is very much alive today in Schoharie—two hundred and fifty years of it—and the people of Davy's Schohar have brought it forth to give them a way of life. Come to think of it, the book does portray another very old tradition lovingly —the tradition of Show Business, be it a medicine show or opera.

"Chill of Dusk" is a disturbingly ugly book whose theme is almost the antithesis of Walter Miller's and Edgar Pangborn's. Its setting is the Maine hamlet of Phoenix, nearly a century after the final war. Here one family has striven doggedly—and dogmatically—to preserve the scholarly tradition of a small New England liberal arts college. And by fighting to keep this intrinsically sterile tradition alive, the men of the Adams dynasty have prevented the people of Phoenix from making the same kind of adjustment to the change that the people of Schohar did after what could be the same war.

There are other forces: a very different kind of Catholic Church from that of the Southwest, French-Canadian and Irish in its inner traditions instead of Spanish; fraternal orders that have clung together long enough to take new form as roving gangs. But the thing I miss in "Chill of Dusk," and find hard to accept, is any feeling of a tradition of the Maine people that would have protected them against the Adams dominance and against the marauders as well. I can't believe that Maine folks are so different from Schoharie folks.

Doubleday did not present "Chill of Dusk" as a science-fiction novel, though no major publisher is more familiar with the field. I am sure

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the author, a young Connecticut professor, did not intend it to be pigeon-holed in the genre. Like other good writers, he used the themes and techniques of science fiction to express some basic ideas about New England traditions—the kind of educational tradition that found Greek and Hebrew more fitting in high school curricula than training to live in the present and the future.

"A Canticle for Leibowitz" is a novel of the triumph of a scholarly tradition; "Chill of Dusk" explores the failure of another. "Davy" portrays the strength of a tradition of the people; "Chill of Dusk," except momentarily, denies it. I like to think that if Doomsday does come, the future will be more like that in Schoharie and Arizona than what Stephen Minot shows us in Maine of the twenty-first century.

WORLD OF THE FUTURE

By Karl Zeigfreid • Arcadia House, New York • 1964 • 189 pp. • $2.95

Karl Zeigfreid is one of the prolific writers of minor English paperback SF—we have no counterpart of the type in the United States at the moment, except the hard-to-find "Vega" reprints of the same books. He may also be writing the rest of the Arcadia SF under various pennames, although there does seem to be a little variation in the styles from book to book.

Wandering warships from two galactic empires encounter each other on the outskirts of Earth and start up a battle more out of habit than for reasons of policy or politics. Their strays clobber Earth, one of them obliterating Geneva. A ship comes down to make regrets over the bystanders official, someone sneezes, and a plague is added to our other troubles. So a pair of Texans, Hank and Tex Roan, send up a booby-trapped Trojan horse to teach the BEMs a lesson. End of book.

This is the kind of cautious space opera in which one of the monsters' super-weapons is a sonic beam, working in the excellent vacuum of space. At that, it's the best I've seen from Zeigfreid.

STAR WATCHMAN

By Ben Bova • Holt, Rinehart and Winston, New York • 1964 • 224 pp. • $3.50

This book is, in a sense, a sequel to "The Star Conquerors," published in 1959. It dips into the same future universe about a hundred years later than the earlier book, and shows some of the problems arising from the victory of the Terran Empire over the Masters. On another level, it is a pretty straightforward parallel to our present world situation. Aimed at teen-agers, it assumes a good deal more maturity than the juvenile SF reaching us from other countries.

For the United States and Russia, former allies against a common enemy now standing each other off in a cold war, take the Terran Empire

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and the humanoid Komani. In place of Viet Nam, or Korea, take the frontier planet Shinar, reft by civil war and occupied by a Komani force, with religious complications, tribal customs, Armed Forces infallibility, State Department inertia and fug-headedness . . .

Emil Vorgens, young Star Watch officer, is sent to Shinar to negotiate a truce with the Komani. Instead, he finds himself dragged into a kind of Custer's Last Stand of an encircled force of Imperial Marines and up to his ears in local politics.

If this is what has happened to the old series of Winston juvenile SF yarns, more power to the present editors for getting writers who can put some meat into their stories and allowing them to do it.

ADAM M-1

By William C. Anderson • Crown Publishers, New York • 1964 • 255 pp. • $3.95

The best capsule description I can think of for this author's books is science fiction as it might have been written by Thorne Smith, if he were a retired Lieutenant Colonel in the U.S. Air Force. I hope you read the author's first book, "Penelope," the story of the talking porpoise with a southern accent. If so, you are bound to recall the Air Force public relations officer who was a wealthy hearse-and-casket magnate in private life, Major Cornelius Callaghan. The casket king links the two books: the rest of the cast is new, but quite as zany as ever.

This time the problem is to combine human judgment with electronic reaction time, to devise a control system for a moon rocket. It's done by transplanting the brain of a cracked-up test pilot into a mechanical body—but the free-wheeling, libidinous "Crash" Murphy finds some pretty serious handicaps in his mechanical body, especially when he is endowed with an altogether terrific red-headed nurse. Adam M-1, the first Astrodynamically Designed Aerospace Man, is by no means one to let insurmountable problems remain insurmountable, as you will see if you investigate.

The book isn't quite the unrelieved howl of hilarity that "Penelope" was, but it's in the same league.

Reprints

CITY AT WORLD'S END

By Edmond Hamilton • Crest Books, Greenwich Conn. • No. L-758 • 1964 • 160 pp. • 45¢

Reprint of the 1951 hardback—one of the first of the "new era" Hamiltons, and very different from his old world-wreckers.

GLORY ROAD

By Robert Heinlein • Avon Books, New York • No. V-2102 • 1964 • 288 pp. • 75¢

Heinlein's grand "sword-and-sorcery" yarn and "Hugo" contender.

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"THE LAWS OF THINGS"

continued from page 6

hear, see, feel, smell, touch, or taste anything—and within hours he begins to have hallucinations, becomes aware that his mental processes are disintegrating into uncontrollable unreality and madness. Sensory mechanisms need sensory inputs of some sort to fulfill their functions—and to stabilize the normal reality-checking motivation that real human minds actually have.

Now the mouth happens to be one of Man's primary sensory organs—and a very complex one indeed. It's the primary center of taste—and is, in addition, an acutely sensitive tactile organ, surpassing in that respect even the sensitivity of the fingers.

It is, also, the one and only Input to the Organism for solid or liquid substances. Small children frequently experiment with solid-substance inputs into the ears or nose, but usually learn quickly and painfully that those are *not* input stations.

But since Freud had no knowledge of Information Theory, or sensory deprivation experiments, and had the Great Revelation that all men everywhere always had Sex as the One Motivation, naturally it *had* to be Oral Eroticism.

Another one of Freud's Great Revelations was that there existed a Subconscious Mind, and it was conflicts between the Subconscious Mind and the Conscious Mind that led to neurotic compulsions.

Kant, some while earlier, had used the term "Categorical Imperative" instead of "compulsive or repressive"; the essential process was recognized in either case. For Kant, this "categorical imperative" was caused "by means of a function."

And Kepler, in stating the laws of planetary motion had recognized that there was gravity and inertia; Newton's great advance was to give precise *mathematically defined* expression to the Functions by means of which the planetary motions were imperatively determined.

Freud repeated Kant's observations in somewhat different wording —but without the sort of increased precision that Newton added to Kepler's realizations.

For some five thousand years of record preceding Freud, too, there had been recognition of the *ka, psyche, spirit, geist, soul* or whatever the local time-and-place term might be as a part of Man that was immaterial, analogous to the mind, but was not the same thing as mind.

Freud gave it a new name, but there was little change in the realization that this *psyche* was able to exert powerful and, at times, compulsive force over the mind of man.

Freud's greatest—and real—contribution probably was the specific, solid statement that the subconscious

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compulsions *were genuinely compulsions;* that an individual *could not* resist them—that it wasn't "unwillingness" or "stubbornness" or "weakness" that caused an individual to yield to the compulsions. That the psychotic paranoid who murdered a dozen neighbors due to his compulsions was no more able to resist that internally-generated pressure, than a martyr was able to choose *not* to be martyred by renouncing his beliefs.

The Ego, the Id, and the Super-Ego might also be named with somewhat older terms as the Mind (Ego) and the Conscience (Super-Ego) while the Id is perhaps a confusion of two other factors—the ancient instinctive wisdom of the race, and the third-factor effect of the interaction of Mind—which is logical and present-time based—and Conscience—which is acculturation, and neither logical nor present-time based.

Actually, of course, large parts of Conscience-acculturation agree one hundred per cent with large areas of the ancient racial instincts. In such areas, naturally, the culture claims that it, and it alone is the source of those Great Good Ideas. Where acculturation and racial wisdom disagree, naturally the culture insists that *that* is "nothing but evil old instincts which must be suppressed."

When conscience-acculturation demands the logically impossible, or irrational, naturally there's a conflict between it and Mind. (But acculturation will never acknowledge that *it* is wrong!)

However, we're dealing here, quite obviously, with the area of Morality—which Religion has always claimed for its own. And, of course, with most intense emotional areas—which have, from the findings of anthropologists, been the province of the witch-doctor-priest for at least two hundred thousand years.

Whether you say you are working with a man's Super-Ego or say you're treating his Soul is a distinction of verbal noises—unless you can define the difference in clear, functional terms. And if you claim that psychoanalysis is a Scientific Approach, rather than a priestly-witch-doctor method, that claim, too, needs some specific, functional definition.

It does appear though, that a "Scientific Approach" stemming from the revelations provided by one man, who derived his great basic realization of the Universal Motivation of All Mankind by studying a cultural enclave, in a central European city during an exceptionally prudish era, needs considerable reevaluation.

I can't help wondering what great revelations of fundamental human emotional structure would have come from Freud if he'd grown up among, and worked with, Dobu Islander patients. Sex being

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uninhibited among the Dobu Islanders, it wouldn't have appeared as the critical "missing leg"; whether he'd have called their culture of mutual murder motivation a death-wish culture or a security-seeking culture I can't decide. But on observing that men like to use their mouths—Kipling had made that observation before Freud!—a Dubu Island Freud would certainly not have spoken of "Oral Eroticism." "Oral Morbidity" possibly, or perhaps "Oral Security-seeking."

Naturally, I'm ever so much wiser than Freud on these things; hindsight is *sooooo* much more perceptive than foresight. Any high-school kid today is wiser than Aristotle, too. I've got a slightly unfair advantage consisting of two generations of world-wide efforts by anthropologists, archeologists and historians, plus the immense amount of work done by cyberneticists, Information Theory analysts, the space-scientists working on sensory deprivation—and the statistics of what's actually happened with patients treated with psychoanalysis during the last half-century.

My objections are not to Freud; he was a genuinely sincere and highly important philosopher of the mind.

My objections are to the Freudians—who have the same half-century advantages I have, and haven't adequately used them. Freud *didn't* know about Information Theory and sensory deprivation effects; he *didn't* have the data of a half-century of cultural anthropology to use in studying out the true, universal-to-Mankind motivations.

The modern Freudians *do* have that data.

Why don't they use it—when they also have the data *from their own statistics* that the recovery rate among psychoanalytical patients is not significantly different from the recovery rate among untreated patients?

Statistics on the recovery rate among patients treated by witch doctors are somewhat hard to come by, of course. But the reports from cultural anthropologists indicate that perhaps the witch doctors have significantly better therapy techniques.

The greatest improvement in psychotherapy since records have been kept seems to have come about since the adoption of a physiological approach, thanks to learning from the Hindu herb doctors that tranquilizer substances exist.

It is, of course, improper to attack a man's religion; with the witch doctors, we would be dealing with the native religion.

I hope I have not, in this discussion, attacked anyone's religious faith. ■ THE EDITOR.

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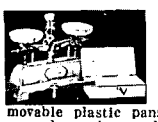

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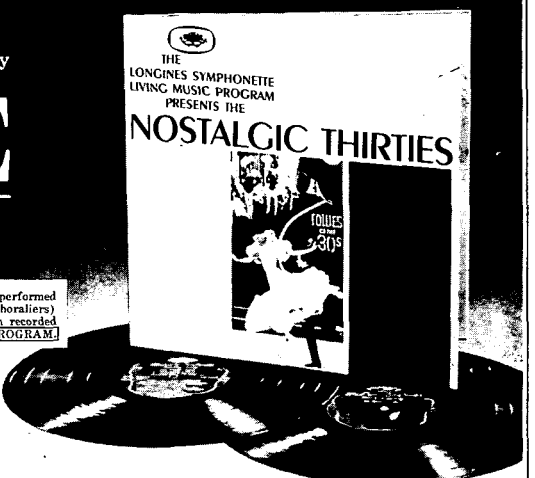

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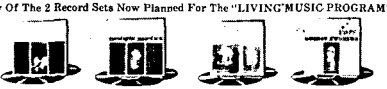

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